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Integrating Bicycles and Transit in Santa Barbara, California

**Final Report
March 1983**

UMTA/TSC Project Evaluation Series
Service and Management Demonstration Program

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16. Abstract

The integration of bicycles and transit in Santa Barbara, California, was designed as an innovative demonstration project, to increase local transit ridership. The Santa Barbara Metropolitan Transit District (SBMTD) installed bicycle racks and lockers at selected bus stops and attached bicycle trailers to fixed-route minibuses. The demonstration services operated for 18 months and the SBMTD continued these services intact the following year.

This report evaluates the Santa Barbara Demonstration Project. It examines the impacts of integrating bicycles and transit services on: equipment design, selection of routes and bicycle storage sites, implementation, marketing, travel time, equipment reliability, safety and security, weekday vs weekend, seasonal, and bicycle-trailer vs. system ridership, user and trip characteristics, user attitudes, fleet characteristics, and capital and operating expenses. A final section examines the integration of bicycle and transit services in other applications.

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PREFACE

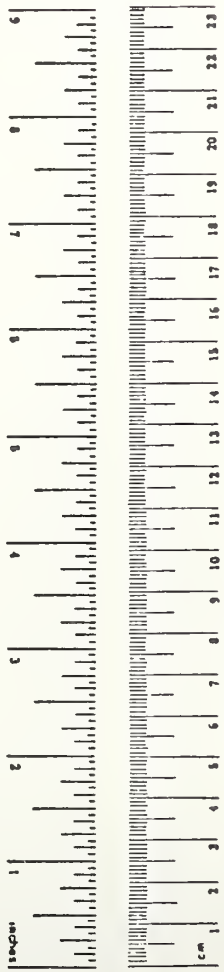
This report is part of the TSC Project Evaluation Series for the UMTA Service and Management Demonstration Program, U.S. Department of Transportation. Mr. Robert Casey of the Transportation Systems Center (TSC) served as the evaluation monitor. Mr. Paul Fish of the Urban Mass Transportation Administration (UMTA) helped to obtain relevant data and to oversee the project.

The analysis and evaluation report was prepared by SYSTAN, Inc., under the management of Dr. Roy E. Lave. Ms. Debra A. Newman served as the project manager. Ms. Marlies Bebendorf assisted in compiling and analyzing the data and writing sections of this report. The SYSTAN evaluation team also worked with Sherrie Allen and Gary Gleason of the Santa Barbara Metropolitan Transit District to collect the necessary data.

METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
in	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
		AREA		
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	square miles	2.6	square kilometers	km^2
	acres	0.4	hectares	ha
		MASS (weight)		
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
		VOLUME		
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft^3	cubic feet	0.03	cubic meters	m^3
yd^3	cubic yards	0.76	cubic meters	m^3
		TEMPERATURE (exact)		
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C



Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
		AREA		
cm^2	square centimeters	0.16	square inches	in^2
m^2	square meters	1.2	square yards	yd^2
km^2	square kilometers	0.4	square miles	mi^2
ha	hectares (10,000 m^2)	2.5	acres	
		MASS (weight)		
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
		VOLUME		
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m^3	cubic meters	35	cubic feet	ft^3
m^3	cubic meters	1.3	cubic yards	yd^3
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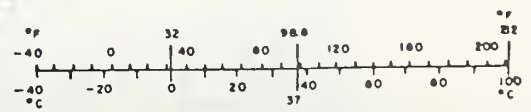
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



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1. EXECUTIVE SUMMARY

1.1 OVERVIEW

The Santa Barbara Bicycle Paratransit Demonstration tested the feasibility of increasing transit ridership by integrating bicycles with fixed-route bus services. The Santa Barbara metropolitan area is concentrated along the southern California coastal plain, the temperature is moderate most of the year and many persons attend or work at the University of California-Santa Barbara campus or at one of several colleges or downtown locations. These factors, combined with a fairly active local bicycling community prompted the Santa Barbara Metropolitan Transit District (SBMTD) to try to coordinate bicycles with transit services.

This project was sponsored by a Service and Methods Demonstration grant from the Urban Mass Transportation Administration, U.S. Department of Transportation. The demonstration began in September 1978 and ended in December 1980, although these services did not begin until June 1979. The SBMTD continued to operate these integrated bicycle and transit services until January of 1982, when budget and operating constraints forced the SBMTD to cut back most of these services.

This report evaluates the Santa Barbara demonstration project. The evaluation is concerned with the impacts of integrating bicycles and transit on 1) the design, implementation and marketing aspects, 2) the changes in the level of services, 3) the changes in travel and user's behavior, and 4) the economics and efficiency of the services. This evaluation also examines other recent applications of bicycle and transit integration in the United States and identifies some potential applications for future integration.

1.2 DESIGN, IMPLEMENTATION AND MARKETING

Other operators' experiences and earlier tests gave the SBMTD insights into developing plans and designs for the bicycle-trailers, racks and lockers, the bus trailer routes and the bicycle storage sites. This may have helped to avert or at least minimize their service planning and implementation problems. The SBMTD's introductory marketing campaign, mid-term advertising blitz and TV spot seemed less effective in making people aware of the service than the public's ability to see the daily operation of the bicycle-trailers.

1.3 LEVEL OF SERVICE

The bicycle-trailers provided reliable service with regular maintenance and the trailers, racks and lockers provided the necessary safety and security. The SBMTD tested bicycle-trailers on several existing routes, added one new bicycle-trailer route and expanded services significantly on their one previous bicycle-trailer route. As a result, the number of passengers who accessed transit by bicycle increased substantially and the demonstration services were able to expand their effective transit service area coverage. The average time spent loading and unloading each bicycle was about 35 seconds. This time, if not absorbed through more effective route scheduling, can increase vehicle running time by four percent.

1.4 TRAVEL BEHAVIOR

The bicycle-trailer option and the service changes on the routes were successful in attracting new riders to transit and in diverting some automobile users. Thus, bicycle-user patronage and overall ridership increased, especially on one of the bicycle-trailer routes, resulting in further increases in its level of service. A few rack sites were popular, but the lockers were never used.

School holidays had a more significant impact on bicycle-trailer ridership than weather although weekend users showed more response to changes in weather than weekday users. This is likely because the bicycle-trailer service was more popular with young adults and students and attracted proportionally more work and recreational trips than conventional transit. Users ranked cost, convenience, energy-efficiency and safety as the best attributes, with lower rankings given to the frequency and speed of the bicycle-trailer services.

1.5 ECONOMICS AND EFFICIENCY

The SBMTD spent $37,500 to purchase and install six bicycle-trailers, 15 trailer hitches, 24 bicycle lockers and 150 bicycle racks. The SBMTD had to use minibuses to provide the bicycle-trailer services because of operational constraints. Minibuses have better fuel economy and smaller passenger capacity and were thus less costly to operate per mile but more costly to operate per passenger than conventional-size vehicles. On the other hand, SBMTD deployed minibuses on routes where passenger demand did not warrant service by full-size buses. By coordinating minibus routes with bicycle-trailers SBMTD was also successful in attracting additional riders to transit. This strategy thus lowered the overall cost per passenger of operating these otherwise inefficient routes. Annual additional operating costs were about $44,000.

1.6 OBSERVATIONS AND IMPLICATIONS

Although there appears to be a limited market for bicycle and transit integration, several communities are integrating bicycles and transit services successfully. The most common and cost-effective means of integrating these services is to provide bicycle racks and/or lockers at convenient transit stops. A few cities provide racks or facilities on their buses to accommodate bicycles. And most of the major U.S. urban rail systems allow bicycles on their trains during off-peak and weekend hours.

2. BACKGROUND

2.1 PROJECT DESCRIPTION

The Santa Barbara Bicycle Paratransit Demonstration Project was designed to test the feasibility of increasing transit ridership by coordinating bicycles with fixed-route public transit services. To coordinate these modes, bicycle trailers were attached to the rear of fixed-route mini-buses, and bicycle racks and lockers were installed at designated bus stops. Providing bicyclists with direct access to paratransit services can increase bus ridership by allowing a bicycle rider mobility at both ends of a bus trip. Coordinating the location of bicycle racks and lockers with transit can encourage bicycle riders to store their bicycles at transit access points, creating a "bike-and-ride" service.

The Santa Barbara Metropolitan Transit District (SBMTD) tested these two major bicycle and transit integration innovations under a U.S. Department of Transportation UMTA-sponsored Service and Methods Demonstration grant. The demonstration project began in September 1978 and ended in December 1980. For one full year after the demonstration ended, the SBMTD continued to operate these same integrated bicycle and transit services. In January 1982, the SBMTD eliminated services on all but one bicycle-trailer route, in an effort to cut overall costs and increase system productivity.

2.2 PROJECT OBJECTIVES

The major goal of the project was to increase transit ridership. The demonstration project objectives were:

1. to extend transit coverage to more trip origins and destinations which were not within a convenient walking distance of bus service by facilitating bicycle access to public transportation;

2. to reduce the total travel time for bicycle/transit trips to make these trips more competitive with the private automobile; and

3. to compile reference information for other transit operators interested in coordinating bicycle and transit services.

2.3 KEY EVALUATION ISSUES

The primary aim of the project evaluation is to objectively collect, analyze and provide information on the major demonstration issues. The following issues are examined in this evaluation of the Santa Barbara demonstration:

- Design and implementation issues, including a description of the planning phase, criteria for equipment design, the bike-bus route and bike storage site selection process, and the market research and advertising activities associated with the demonstration;

- Level-of-service impacts, dealing with travel times of bicycle and walk access passengers, equipment reliability, and the security of using the bicycle-trailer and bicycle storage facilities;

- Travel behavior impacts, analyzing ridership patterns, user and trip characteristics, and user and non-user attitudes associated with the bicycle and transit services; and

- Economic and efficiency issues, summarizing the capital and operating costs and the productivity of coordinating bicycle and transit operations.

The analysis and major findings pertaining to these issues are presented in Chapters 4-7 of this report. Chapter 3 discusses the Santa Barbara project setting and gives an overview of the demonstration. Chapter 8 summarizes the major demonstration findings, other coordinated bicycle and transit projects and the potential future applications.

2.4 ORGANIZATIONAL PARTICIPANTS

The relationships between the organizations involved in the Santa Barbara demonstration are shown in Exhibit 2.1. The Santa Barbara Metropolitan Transit District implemented the demonstration under a funding contract with the Office of Service and Methods Demonstrations, Urban Mass Transportation Administration (UMTA) of the U.S. Department of Transportation. SBMTD contracted with different consultants to provide service planning, management and data collection assistance.

The Transportation Systems Center (TSC) of the U.S. Department of Transportation is responsible for the evaluation of all UMTA Service and Methods Demonstrations. TSC contracted with SYSTAN, Inc., to evaluate the Santa Barbara demonstration. SYSTAN, Inc., prepared an evaluation plan,[1] and conducted all demonstration monitoring, data collection and analysis tasks for the evaluation of the demonstration.

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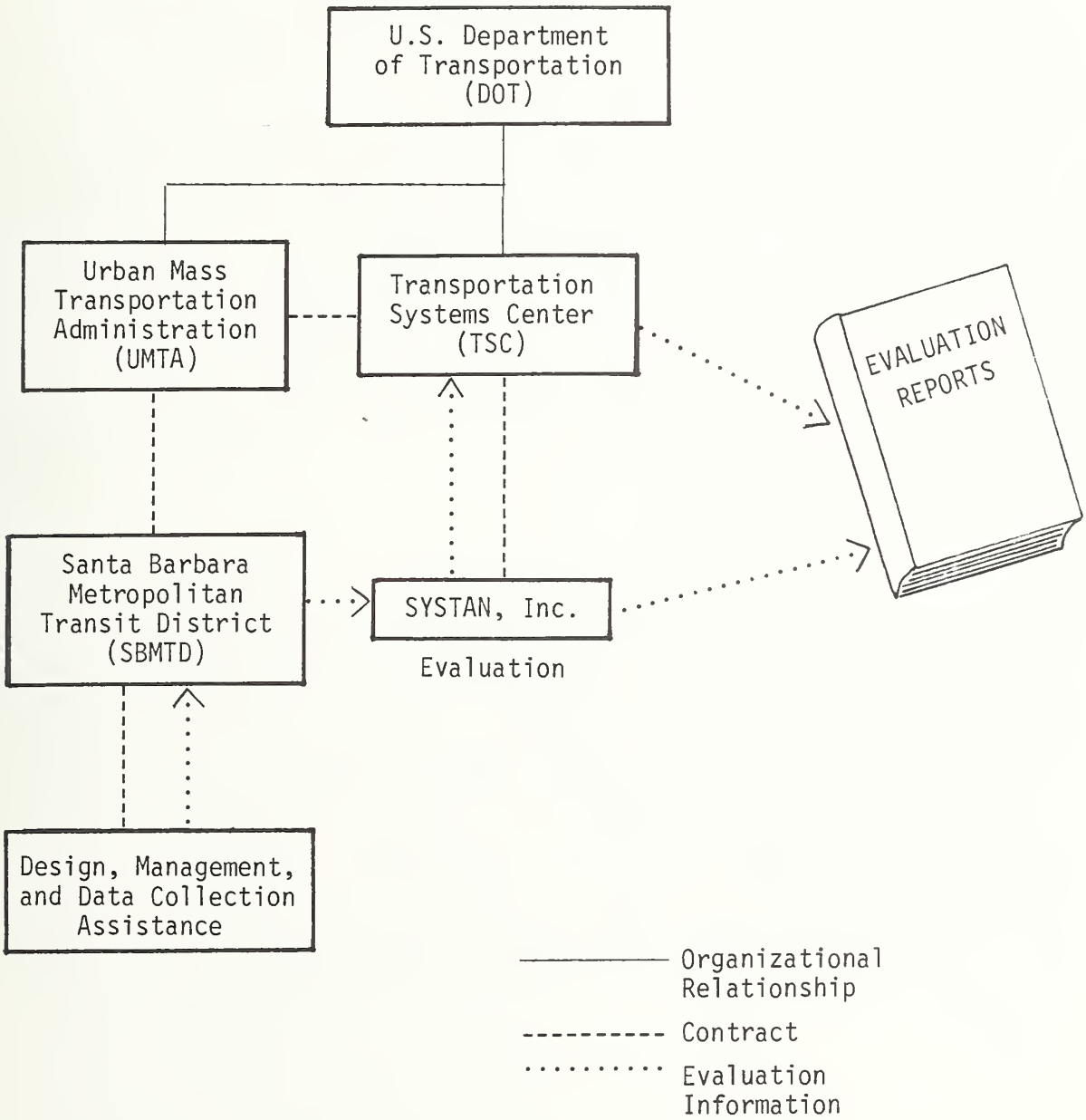
[1] SYSTAN, Inc., Evaluation Plan for the Santa Barbara Bicycle/Paratransit Demonstration, Los Altos, California, February 1979 (prepared for TSC under contract No. DOT-TSC-1416).

EXHIBIT 2.1

ORGANIZATIONS INVOLVED IN THE SANTA BARBARA DEMONSTRATION



3. DEMONSTRATION SETTING AND OVERVIEW

3.1 THE SANTA BARBARA METROPOLITAN AREA

3.1.1 Site Description

The demonstration took place in the Santa Barbara metropolitan area, a southern California coastal community bounded on the north by the Santa Ynez Mountains and on the south by the Pacific Ocean. These geographic features forced land development to be concentrated on the coastal plain, the South Coast Area, which extends approximately 18 miles in an east-west direction and about four miles inland. The temperature is moderate all year, ranging from 56 to 72 degrees Fahrenheit during the summer and from 47 to 66 degrees Fahrenheit during the winter. Santa Barbara's average annual rainfall is 18 inches. The scenic setting, a pleasant climate and an interesting history have made Santa Barbara a major resort, retirement and outdoor recreation community. Exhibit 3.1 contains a map of the Santa Barbara metropolitan area.

3.1.2 Population

In 1980, about 75,000 residents lived in the City of Santa Barbara, within a metropolitan South Coast Area of about twice that population. Santa Barbara County, which includes the four communities of Santa Barbara, Carpinteria, Montecito, and Goleta Valley in the South Coast Area and seven communities in the North County Area, had an estimated population of over 300,000 in 1980. Between 1960 and 1970, the City of Santa Barbara grew an average of 1.9% annually in population, but between 1970 and 1980 this growth rate dropped to 0.7% annually. This slower growth trend is expected to continue until 1985. The majority of the remaining South Coast population lives in the Goleta Valley, an area slightly west of the city. During the 1960-70 period, this area's population grew approximately 12.3% annually, but dropped to a 1.7% average annual growth during 1970-80.[1]

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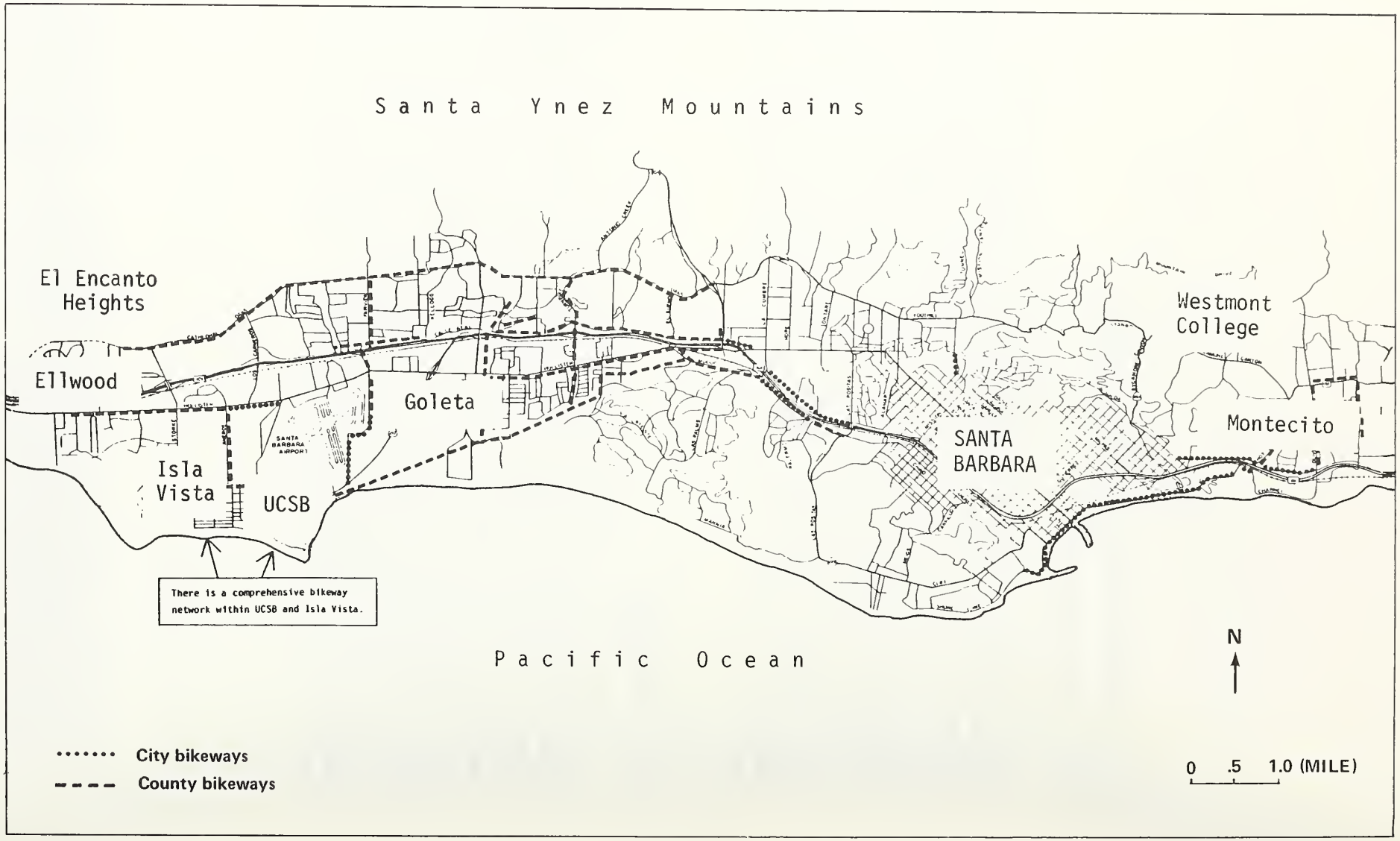
[1] Santa Barbara County-Cities Area Planning Council, Transportation System Management Element, June 1978, pages 5-6; Economics Research Associates, 1980 Economic Base Update: With Market Demand Projections, Projections for Selected Land Uses, February 1981, pages IV-4 to IV-7.

Exhibit 3.1

THE SANTA BARBARA METROPOLITAN AREA



3.1.3 Employment

The Goleta Valley is also home for the University of California at Santa Barbara. Approximately 75% of the 14,000 students live in this area and, with approximately 1,500 employees, the University is the largest single employer within the Santa Barbara metropolitan area. There are another 7,000 South Coast residents at Santa Barbara City College, and another 900 students at Westmont College, located in the hills above Montecito. The County of Santa Barbara employs approximately 1,000 employees in its downtown complex and is the largest employer in the urbanized area. Retail trade and services, light industry and research and development firms also play a significant role in the South Coast Area's economy.

3.2 PUBLIC TRANSPORTATION IN SANTA BARBARA

3.2.1 SBMTD Fleet, Fares and Services

Public transportation in the Santa Barbara South Coast Area is provided by the Santa Barbara Metropolitan Transit District. This system began operating with a fleet of 12 buses and a 1969 ridership of 1.2 million. By 1980, it had grown to a 62-bus operation with an estimated annual ridership of 6.5 million. During the study period, the SBMTD operated traditional fixed-route service with average headways of 30 minutes on 27 weekday routes, with reduced service levels after 6:00 p.m. and on weekends. The basic SBMTD fare was 50 cents, elderly and handicapped riders paid 20 cents, and transfers were free. Between January and September 1979, an additional 15 cents was charged for each bicycle on the bicycle-trailer; otherwise, this service was free. Transit users could purchase three tokens for $1.35, and Santa Barbara City College students and elementary schoolchildren could buy a monthly pass for $15. UCSB students were eligible to buy a quarterly pass for $4.20. SBMTD also operated Handi-Trans, a one-vehicle semi-scheduled demand-responsive service for the handicapped.

3.2.2 Ridership

According to an April 1978 on-board survey, 40 percent of all SBMTD trips are for school and 29 percent are for work. When schools are in session, average weekday ridership is approximately 19,400, and almost 30 percent of these passenger trips are made between 7:00 a.m. and 8:00 a.m. and between 2:00 and 3:00 p.m., closely corresponding to local school hours. After 3:00 p.m. and during the summer months when students are on vacation, system patronage drops substantially.

3.2.3 Organization

The SBMTD has a total management, driver and maintenance staff of about 135 employees. Being a relatively small, closely-knit organization, the SBMTD is able to successfully combine both their administrative offices with their main operations and maintenance terminal in downtown Santa Barbara; an auxiliary dispatching and maintenance terminal is located in Goleta. This organizational arrangement enables management and labor to work closely together and may result in fewer institutional constraints to innovation.

3.2.4 Previous Bicycle Services

Before the demonstration project began, SBMTD operated one bicycle trailer transit route (Route #13) between the University of California campus in the Goleta/Isla Vista area and downtown Santa Barbara. Transit passengers were charged an additional 15 cents to transport their bicycles on the trailer. After operating this dual-mode route intermittently for three years, SBMTD wanted to test its potential in other areas of the District. This prompted the application for the demonstration project.

3.3 BICYCLES AND THE BIKEWAY SYSTEM IN SANTA BARBARA

For over a decade, Santa Barbara bicycle groups have worked with public agencies to promote the construction of bikeways and the use of bicycles as a transportation alternative to the private automobile. In 1968, local bicyclists began working with an ad hoc City Bikeway Committee to construct the Cabrillo Bikeway, a 3.4-mile oceanfront bicycle route. In 1971, although bikeway construction funds were extremely limited, the City and County of Santa Barbara managed to pool their resources with the University of California to design and construct another bicycle path to the University. Bikeway monies became available in April 1973, when California legislators earmarked funds from the State Transportation Development Act (TDA, SB-325) for the development of bicycle and pedestrian facilities. TDA monies, which come from State gasoline tax revenues, are also used to support SBMTD transit operations. With funds available, and responding to local demand for improved bicycle facilities, the Santa Barbara City Council appointed a Citizens' Bicycle Transportation Plan Committee to develop a Bicycle Master Plan.

Today, both the City and County of Santa Barbara have adopted Bikeway Master Plans. There are over 44 miles of on- and off-road bikeways throughout the Santa Barbara metropolitan area (see Exhibit 3.1). Recent bicycle volume counts taken at several bikeway locations show that an average of 600-700 bicyclists per weekday use these

facilities.[2] A 1978 County Bicycle Safety Study, based on 1975 population data and age-specific rates, estimated that over 104,000 persons in the South Coast Area rode bicycles during the preceding 12 months; this represents about 60 percent of all South Coast Area residents. Santa Barbara's active bicycle-riding community and local public commitment to bicycles results from a large student population, a mild climate, local environmental concerns and energy shortages enhancing the role of the bicycle in Santa Barbara's overall transportation system.

3.4 DEMONSTRATION HISTORY

The demonstration project consisted of a nine-month planning phase and an 18-month implementation phase. Project planning began in September, 1978 and demonstration services operated from June 1979 to December 1980. Data were collected for the evaluation throughout this period. After the demonstration ended, the Santa Barbara Metropolitan Transit District continued operating coordinated bicycle and transit services. A detailed schedule of events is listed below:

June 1977	SBMTD submits final application for demonstration grant to UMTA
January 1978	UMTA approves Santa Barbara's demonstration grant
Summer 1978	SBMTD solicits RFP's for consultant planning and management assistance
September 1978	SBMTD subcontracts with Wilbur Smith and Associates for consultant services
	Service planning and demonstration system design begin
November 1978	Consultant conducts and analyzes the University and college student opinion surveys
January 1979	SBMTD develops specifications for bicycle-trailers, racks and lockers
	Household surveys are mailed to Santa Barbara County residents
February 1979	Downtown and suburban employee surveys are conducted

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[2] TSM Element, pg. 64-65.

March-April 1979	SBMTD acquires a prototype bicycle-trailer and begins using it in existing operations
	Bicycle-trailer routes and bicycle rack and locker sites are selected
	Marketing strategies are developed
	SBMTD acquires bicycle racks and lockers
April-December 1979	150 bicycle racks and 24 lockers are installed
June 18, 1979	New bicycle-trailer operations begin on Route 13
June-August 1979	First marketing campaign is conducted, advertising bicycle-trailer services
September 1979	Six new bicycle-trailers are available for service
	Bicycle-trailer services are introduced on Route 9 and on Route 16
November 1979	SBMTD conducts surveys among students, bicycle rack users, and passengers on bicycle-trailer routes
	Bicycle-trailer service is switched from Route 9 to Route 8
	Six-month marketing campaign begins
January 1980	Bicycle-trailer service is discontinued on Route 8 and introduced on Routes 12 and 13B
May 1980	SBMTD surveys households, employees, bicycle rack users, and passengers on bicycle-trailer routes
September 1980	SBMTD modifies service on existing bicycle-trailer routes
December 1980	Demonstration ends

3.5 DEMONSTRATION BUDGET

The Santa Barbara demonstration was completely funded by UMTA's Section 6 Service and Methods Demonstration Grant. The total budget was $182,000, to be expended over slightly more than two years. Funds were allocated as follows:

Planning-Implementation Costs	$50,000
Capital Equipment	
* Trailer Acquisition	36,000
* Rack and Locker Acquisition	36,000
Operating Costs	
* Trailer, Rack and Locker Maintenance	6,000
* Operations Management and Service Modifications	40,000
Contingencies	20,000
Total	$182,000

4. DESIGN AND IMPLEMENTATION ISSUES

4.1 PROJECT BACKGROUND AND IMPLEMENTATION

4.1.1 Initial Trailer Services

The Santa Barbara Metropolitan Transit District had been experimenting with bicycle-trailer services for about three years before the demonstration. In 1975, a wooden bicycle-trailer built by San Diego State University was towed behind a 19-passenger mini-bus (see Exhibit 4.1). The bicycle-trailer and transit service was initially well received by the public, but trailer reliability problems eventually caused ridership to decline. In addition, the trailers' bicycle tie-down mechanisms were difficult to operate, damaged bicycles, endangered bicyclists, and prolonged bicycle loading and unloading times. Moreover, this prototype trailer could not withstand extended freeway service due to an inadequate suspension system, and finally "shook itself apart" from the stress of freeway operation. In March 1976, after just over one year of service, Santa Barbara's first integrated bicycle-trailer and paratransit service was discontinued.

4.1.2 Improved Trailer Services

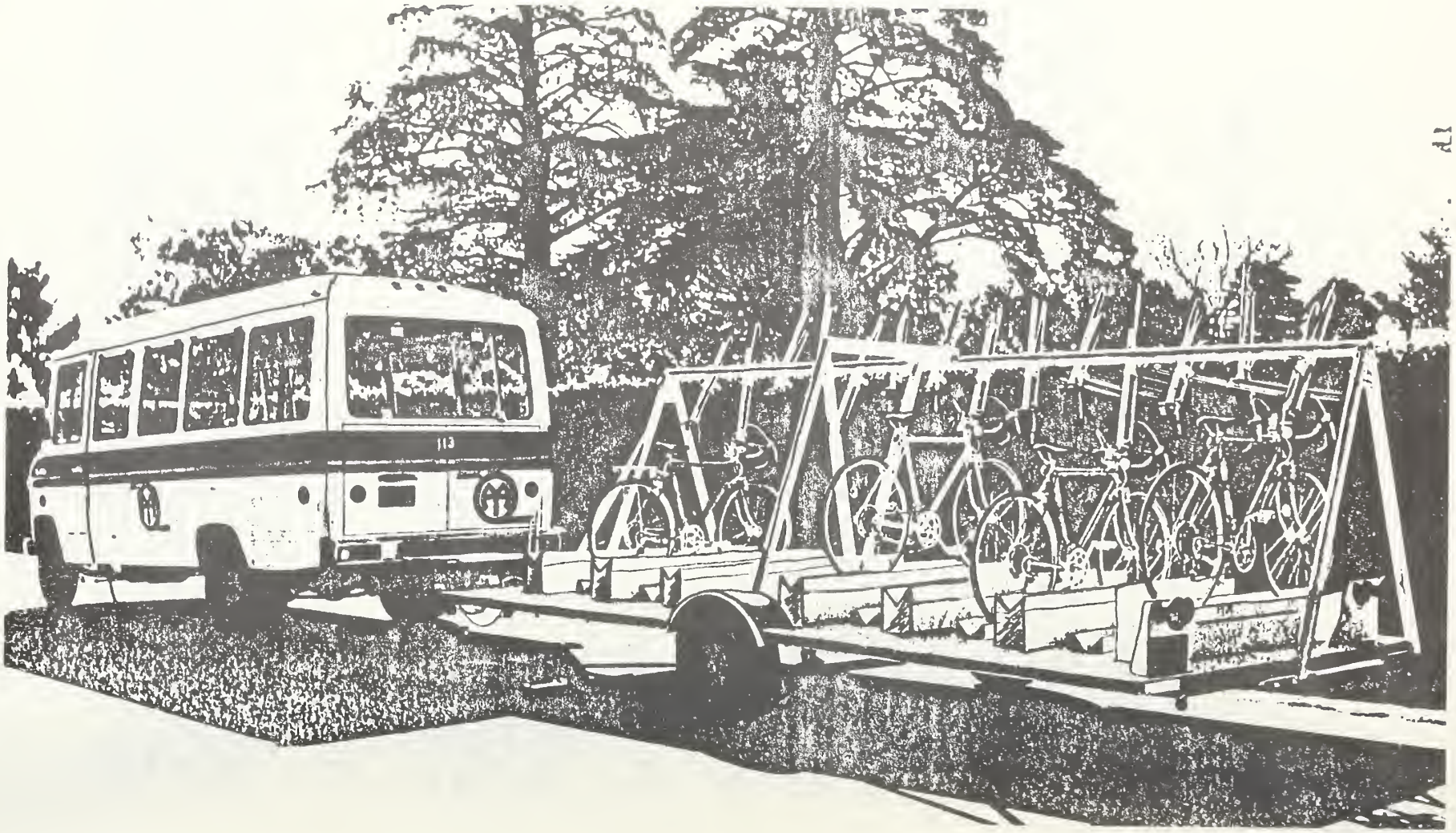
The SBMTD then designed and constructed an aluminum 14-bicycle-capacity trailer which could be quickly and easily used by bicyclists. This would reduce the bicycle-trailer route dwell times and improve reliability of the service. Integrated bicycle-trailer and paratransit service was reintroduced between the University of California at Santa Barbara (UCSB) and downtown in late 1977, operating hourly on weekdays between 7:15 a.m. and 6:15 p.m.

4.1.3 Demonstration Project

While experimenting with this route, SBMTD staff realized that bicycles and transit might also complement each other in other areas of the community. They felt that a coordinated bicycle and bus service could extend transit access to additional users, increase transit ridership, and perhaps decrease local automobile use. At about the same time, the City and County of Santa Barbara, in cooperation with the State of California, was also proposing Transportation System Management (TSM) strategies to promote bicycle use as an integral part of the total

Exhibit 4.1

BICYCLE-TRAILERS: FIRST GENERATION (1975)



Santa Barbara transportation system.[1]

The TSM strategies included the construction of additional bikeways, the installation of storage racks at major activity centers and at various locations in the downtown area and the implementation of automobile parking restrictions and disincentives in downtown Santa Barbara. The expansion of the bicycle-trailer and transit service was seen as a way to enhance these efforts. The SBMTD felt that if the new project was successful, other communities might also be interested in applying the innovative concept to their own transit systems.

On August 4, 1977, the SBMTD submitted an application for UMTA Service and Methods Demonstration (SMD) funding to test the role of coordinating bicycles and transit. The goal was to meet Santa Barbara's local transportation needs, as efficiently as possible. The funds were granted in January 1978.

4.2 BICYCLE-TRAILER EQUIPMENT DESIGN

Although SBMTD's second bicycle-trailer was an improvement over the original model, some important defects were discovered during its operation. These included: insufficient durability of the aluminum bicycle tie-downs, deterioration of the wood decking caused by weather and vibration, accumulation of road dirt and exhaust soot, and a profile too low to prevent scraping on high street crowns. These problems led the SBMTD to develop the following bicycle-trailer design specifications for the demonstration:

- Weight: less than 2,000 lbs. when fully loaded
- Size: maximum 20'x7' with capability of stowing at least 14 bicycles
- Material: all metal (i.e., sheet metal/expanded metal deck - no lumber)
- Axle: one or two-axle design, providing maximum trailer stability (no waving)
- Wheels: no greater than 13''
- Suspension: a system including both springs and shock absorbers
- Profile: appropriate design to prevent scraping on high street crowns and drainage channels

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[1] Santa Barbara County-Cities Area Planning Council, Transportation Systems Management Element, June 1978.

- Electrical: conduit for wiring
- Rear Lights: at least 3 feet above ground
- Exhaust: deflection necessary (trailer or bus device)
- Road Dirt: deflection necessary
- Compatibility: to fit with SBMTD trailer hitches and bicycle tie-downs
- Bicycle access: provisions for easy curb loading and unloading of bicycles
- Certification: State Department of Motor Vehicles, to be secured by manufacturer.

SBMTD built and tested one prototype trailer before contracting a local welder to build five more trailers to these specifications. Exhibit 4.2 shows three pictures of the trailers in use during the demonstration. The major structural specifications of these third-generation trailers are contained in Appendix A. Presently, there are no patents on the trailers.

The only major design problem with the demonstration trailers was that their electrical systems were not compatible with the SBMTD Mercedes minibuses. SBMTD rewired each trailer before service began. Two minor difficulties, however, persisted with continued use; the rubber tie-down cords needed constant replacement and some dirt still accumulated on the trailers. The design of the bicycle tie-downs is illustrated in Exhibit 4.3.

4.3 BICYCLE STORAGE FACILITY DESIGN

The installation of bicycle storage facilities at major activity centers throughout the service area was another feature of the Santa Barbara demonstration. The SBMTD defined the following requirements for bicycle lockers and racks:[2]

Locker Specifications

- Must stow 2 bicycles each;
- Must be weather resistant;

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[2] SBMTD Request for Proposals, March 1979

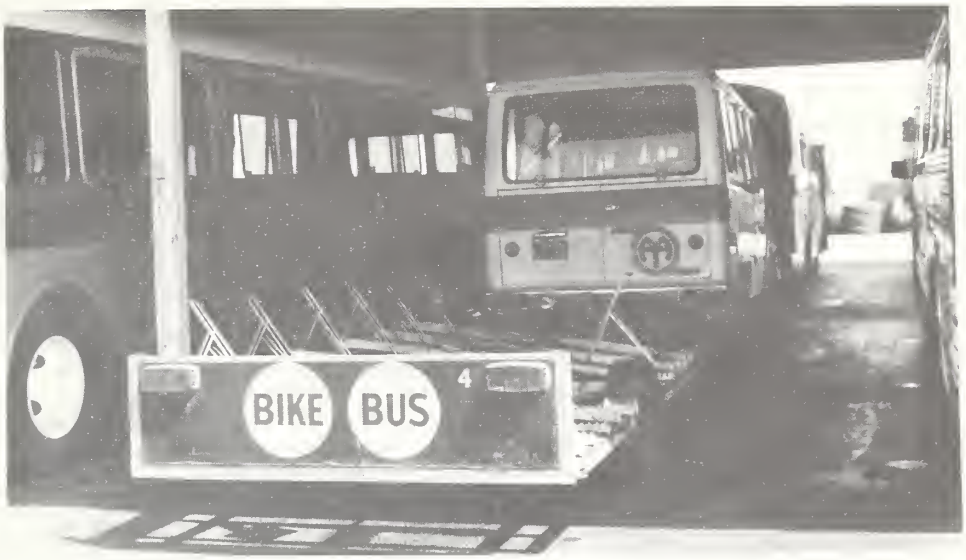


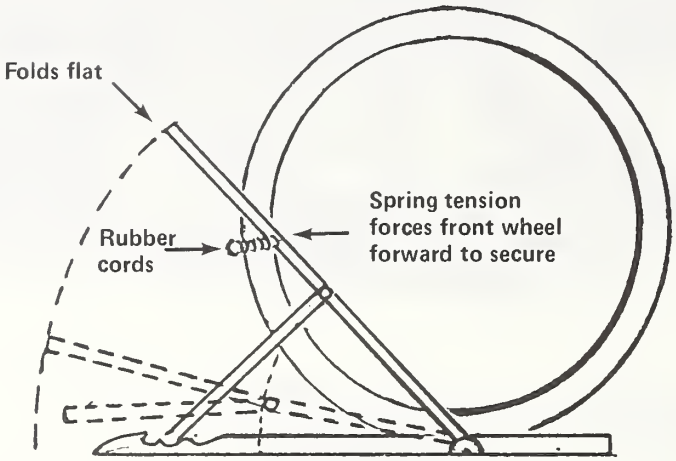
Exhibit 4:2

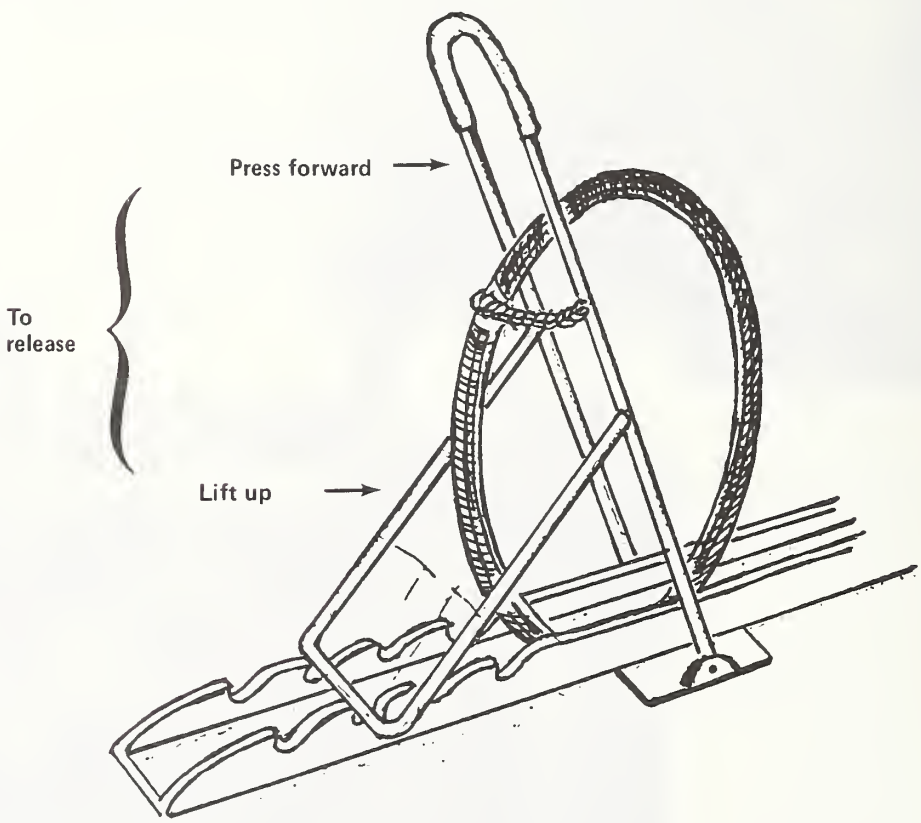
BICYCLE-TRAILERS:

THIRD GENERATION (1979)

Exhibit 4.3

BICYCLE-TRAILERS: BICYCLE TIE-DOWN DESIGN





- Must withstand intrusion when locked;
- Must be architecturally compatible;
- Must specify mounting requirements of box;
- Must have provision for user lock or hasp type fastening and shielding from cutting.

High Security Racks

- Must support variety of bicycles;
- Must be easy to park and remove bicycle;
- Must secure front and rear wheels and frame of bicycle;
- Must not damage bicycle parts;
- Must withstand minimum bicycle theft attempts;
- Must be architecturally compatible.

Regular Racks (Multistall)

- Must support variety of bicycles;
- Must provide minimum bike security;
- Must not damage bicycle;
- Must be architecturally compatible.

During the demonstration, SBMTD installed 24 lockers, 82 single-unit high security racks and 69 double-unit regular racks to these specifications. SBMTD purchased the racks from Rally Racks in Sonoma, CA, and the lockers from Sunshine Recreation in Woodland Hills, CA. Exhibit 4.4 shows pictures of the single-unit racks and bicycles parked at two rack sites in Santa Barbara.

4.4 SELECTION OF BICYCLE-TRAILER ROUTES

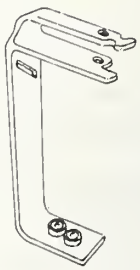
4.4.1 Route Planning

Before the demonstration, one bicycle-trailer provided service on Route 13, connecting UCSB and the downtown Transit Center. Passengers and bicycles could access this service at the two terminal points and at five intermediate stops every 60 minutes during the day. During the six months immediately preceding the demonstration, the SBMTD only operated one bus on this route, although in 1978, two buses operated on 30-minute

Exhibit 4.4

BICYCLE RACKS AND PARKING: TRANSIT CENTER AND UCSB

Santa Barbara Transit Center Parking



Single-unit rack design

UCSB North Hall Parking

headways on Route 13 such that every other trip had the bicycle-trailer. Approximately 70 passengers used this route per day, including 8 or 9 bicyclists.

The SBMTD gained invaluable experience from operating this service, providing the basis for planning the new demonstration bicycle-trailer routes. The following design criteria were initially outlined:[3]

- Mercedes Bus Service. The bike trailers must be operated on routes served by SBMTD's fleet of 19-passenger Mercedes buses, for purposes of safety and maneuverability. (SBMTD later learned their conventional buses also had insufficient strength in the rear to pull the trailers).

- Bus Frequency. The route(s) should have a frequency of at least two buses per hour, with a desired frequency (which may be a composite of several routes) of as high as six buses per hour.

- Type of Service. The bike trailers should be operated on express bus routes having a minimum average speed (including stops and recovery) of 20 miles per hour, with a desired average speed of 25 miles per hour or higher.

- Bicycle Accessibility. The bicycle loading stops should be located at the intersections of selected bus routes with bike paths or collector or local streets which provide safe cycling. In no case should cyclists have to travel in arterial street traffic lanes to reach the bike-bus stops.

- Bus Stop out of Traffic. Bicycle loading stops must be designed so that the bus can pull out of the main traffic stream for loading, because bicycle loading and driver safety procedures require stops lasting 30 seconds to 2 minutes.

- Tributary Areas of Stops. Tributary areas of bike-bus stops should be attractive for bicycling for recreational as well as utilitarian purposes. Areas should include as many residents in the high bicycle use age bracket, as possible.

- Paved Waiting Area. Bike-bus stops should have a paved waiting area in which 3-5 cyclists can stand with their bicycles outside the paved roadway. An existing sidewalk may satisfy this criterion.

As these criteria restricted bicycle-trailer routes to minibuses operating in an express mode, the SBMTD limited their routing options.

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[3] Wilbur Smith and Associates, Quarterly Progress Report of the Santa Barbara Bicycle Paratransit Demonstration, Los Angeles, California, February 1979, pages 29-30.

4.4.2 Changes to Existing Routes

With the beginning of the demonstration in June 1979, SBMTD extended Route 13 seven miles eastward to provide express service from one end of the District (UCSB) to the other (Summerland). When the District expanded in January 1980, Route 13 was extended further eastward to the City of Carpinteria. At the same time, increases in ridership necessitated the placing of a peak-hour booster bus on the western portion of Route 13 (first named Route 13B, then renamed as Route 27). During off-peak hours, the booster mini-bus and bicycle-trailer were deployed on another express bicycle-trailer route (Route 12), where they replaced a standard-size bus. Total service hours on Route 13 increased to 6 a.m. to 9 p.m., with limited service on weekends.

4.4.3 Implementing New Routes

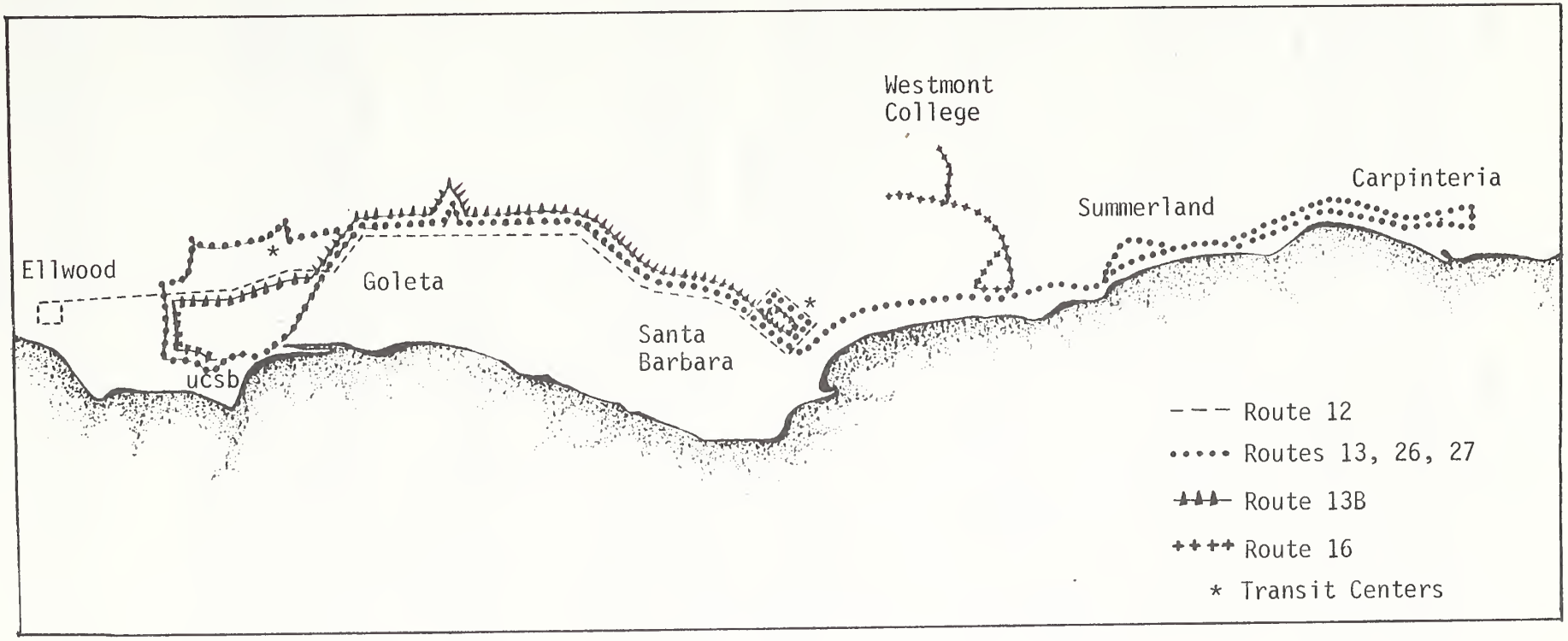
The implementation of bicycle-trailer service to the rest of the District was more difficult. The SBMTD only operated three other routes with minibuses. Two of them (then Routes 8 and 23) were feeder routes and not good candidates for bicycle-trailer service, due to their slow running times and limited maneuverability. Nevertheless, the SBMTD did try bicycle-trailer services on Route 8, for two months between November 1979 and January 1980, after an unsuccessful attempt with bicycle-trailer services on another route.

In September 1979 a trailer was placed on the third minibus route, Route 9, operating locally between UCSB through the Goleta CBD to a nearby shopping center. Many students used this route, but patronage of the trailer remained at a very low level (3-5 bicycles per day, or less than 1% of total ridership). It seems that the short route distance and the low bus speed could not compete with the overall travel time of short bicycle trips. As a result, the SBMTD terminated bicycle-trailer service on Route 9 after less than two months.

The SBMTD also implemented one new bicycle-trailer minibus route in September 1979. Route 16 connected Westmont College, a small college in the foothills, with Coast Village Road, where a transfer to Route 13 was possible. This route operated on 30-minute headways, Monday through Saturday. Route 16 attracted sufficient demand (passengers and bicycles), despite the shortness of the route, probably because of the convenience of using the bicycle-trailer service to climb the steep hills. The map in Exhibit 4.5 shows the major bicycle-trailer routes implemented during the demonstration; Routes 8 and 9 are not indicated because they operated for a total of less than four months.

Exhibit 4.5

BICYCLE-TRAILER ROUTES



4.4.4 Route Problems Arose

A problem concerning the design of bicycle-trailer service on express routes became apparent over the course of the demonstration. Express services were very attractive to many passengers and the minibus routes often operated at capacity. Sometimes, however, the trailer still had room for additional bicycles although the bus was fully loaded, so that bicyclists had to be passed up at bus stops.

The SBMTD has also felt the effects of other bike-trailer route demand problems. Since the major objective of the demonstration was to increase ridership, increased demand for the service would seem to be a positive result. However, regular-size buses can seat 30-50 passengers, and the SBMTD was limited to using their 19-seated passenger Mercedes minibuses on the bicycle-trailer routes.

The SBMTD could only use minibuses on these routes because minibuses are 20 feet in length, as compared to 40-foot regular-size buses. Attaching the 15-foot bicycle-trailer and the hitch extends the minibus and trailer space requirements to conventional bus standards. The minibus and trailer thus did not require additional space at bus stops.

In addition, conventional-size buses pulling a bicycle-trailer would face more significant maneuverability problems in making turns and in the loading and unloading of bicycles than the smaller buses. This was especially important in Santa Barbara's hilly terrain. Also, some narrow residential streets could pose problems.

The minibus engines are also in the front of the vehicle rather than in the rear of the vehicle. This allowed easy access and maintenance in servicing the minibuses, while the trailer remained hitched to the vehicle and reduced the amount of direct strain on the engine from pulling the trailer from behind.

4.5 SELECTION OF BICYCLE STORAGE SITES

4.5.1 Pre-demonstration Facilities

Before the demonstration, SBMTD provided bicycle parking at a number of bus stops, especially at the downtown Transit Center and at the North Hall bus stop on the UCSB campus. At both major locations, demand exceeded supply, although there were 90 bicycle racks at the Transit Center, and 80 racks at North Hall. For several years, lockers had also existed at the downtown Transit Center. But, because of low use, they were eventually removed.

4.5.2 Site Planning

The planning of locations for bicycle storage facilities also followed a list of detailed criteria. These criteria included:[4]

- Bus Access. Bicycle parking facilities must be located on a bus route at a feasible bus stop location (i.e., avoid driveways and places where buses do not now stop, unless stop relocation is considered by the District).

- Site Area. Site area will depend on the mix of parking facilities. A minimum width of 18 feet and a minimum depth of 3.5 feet is needed for each pair of bicycle lockers. High security bike rack sites require a minimum depth of 6 feet, and a width of 3 to 4 feet per pair of bicycles (depending on rack design), plus some apron space which may overlap onto sidewalks.

- Site Feasibility. Encroachment or easement permission should be obtained with minimum delay. This may require location on public land.

- Bike Accessibility. The lockers or racks should be located at an intersection of the bus route with a bike path or a collector or local street which provides for safe cycling.

- Bus Frequency. The base period frequency of buses using the stop should be at least 2 buses per hour, with higher frequencies desired.

- Direct Activity Center Access. Bus routes with bicycle parking should serve major activity centers (UCSB, central Santa Barbara) directly with no change of buses.

- Surrounding Land Use. Bike lockers or racks should be located adjacent to residential neighborhoods which are not already penetrated by bus routes or are served by routes with very long headways (60 minutes or more). A high level of adult bicycle use will be desirable. Locations at schools are undesirable because bicycle parking there may be preempted by student cyclists rather than bus commuters.

- Visibility. To maximize security and discourage vandalism, bike rack and/or locker sites should be fully visible from major streets, from heavy all-day pedestrian corridors, from manned public facilities such as a fire station, or from a private security guard post.

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[4] Wilbur Smith and Associates, Quarterly Progress Report of the Santa Barbara Bicycle Paratransit Demonstration, Los Angeles, California, June 1979, pages 15-16.

- Shelter. If other criteria can be met, a location near a bus shelter is desirable.

- Direction. Bicycle parking facilities should be located on the "inbound" side of the bus route -- toward central Santa Barbara or (if appropriate) toward UCSB or another traffic generation center.

- Coordination with other Bicycle Parking. Consideration should be given to existing bicycle parking facilities and to bicycle parking plans of other organizations, such as the City of Santa Barbara.

4.5.3 Demonstration Sites

During the demonstration, SBMTD installed the bicycle lockers and racks throughout the District according to the criteria listed above. All 24 lockers were installed at the Park 'n Ride facility at the Goleta Transit Center. The SBMTD provided a total of 220 bicycle rack spaces (69 double-unit and 82 single-unit racks). Exhibit 4.6 indicates the bicycle racks and locker locations.

4.6 MARKET RESEARCH AND ADVERTISING

4.6.1 Initial Study

During the planning phase of the demonstration, a consultant to SBMTD conducted a market research study on bicycle and transit use in Santa Barbara County. They obtained the following information from a variety of sources:[5]

- Data pertaining to bus and trailer capabilites, schedules and bus assignments, and background information on the bicycle-trailer project (from the SBMTD);

- Information about the city bicycle path implementation and city plans for bicycle racks along Cabrillo Bikeway (from the Santa Barbara City Traffic Department);

- An outline of school attendance area boundaries in Santa Barbara (from the Santa Barbara School Headquarters);

- Information about County bicycle path implementation, County bicycle path plans, and bicycle traffic counts on Atascadero Creek Bikeway east of Ward Blvd. (from the County Transportation Department);

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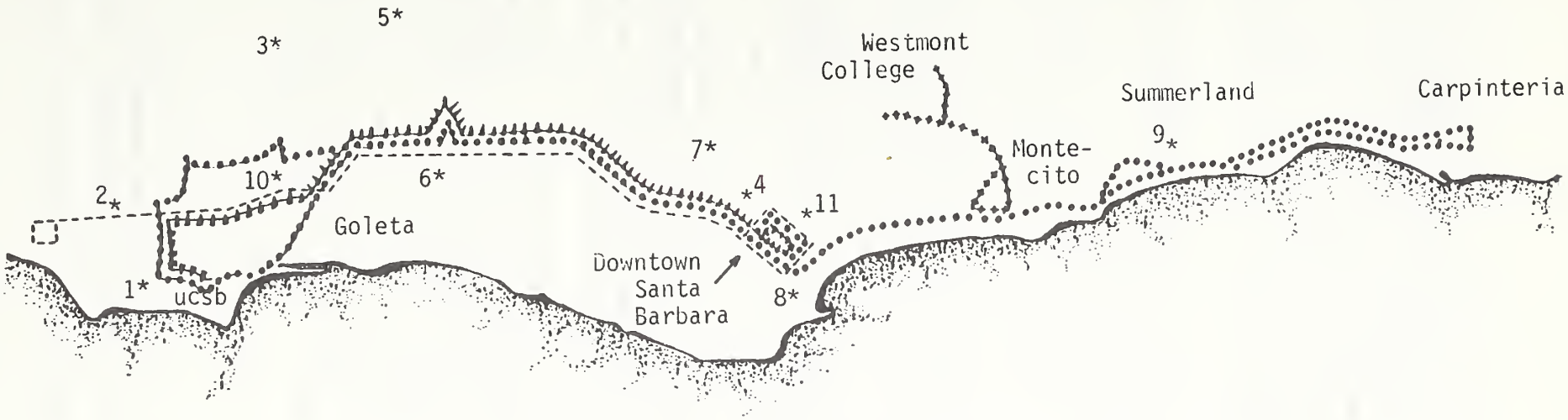
[5] For detailed results see: Wilbur Smith and Associates, op. cit., February 1979, pages 12-22.

Exhibit 4.6

BICYCLE RACK AND LOCKER LOCATIONS



Major Bicycle Rack Locations (*):

1	Los Carneros & El Colegio	7	State & Alamar
2	Storke & Hollister	8	Castillo & Montecito
3	Cathedral Oaks & Fairview	9	Summerland Post Office
4	Arrellaga & Castillo	10	Goleta Transit Center
5	Cathedral Oaks & Patterson	11	Santa Barbara Transit Center
6	Hollister & Turnpike		

All bicycle lockers are installed at the Goleta Transit Center (10).

- Material on the UCSB Bicycle Safety Study (from the University of California and the Santa Barbara County Transportation Study);

- Results of a market segmentation study investigating bicycle use among various groups within the community (from the County Transportation Department);

- Results of surveys conducted among students, residents, and employees in Santa Barbara County (conducted by the consultant).

The last two information sources - the market segmentation study and the survey results - are briefly summarized here because they were the most revealing indicators of potential demand.

4.6.2 Results of Study

An examination of data describing the population of Santa Barbara County showed that the 16-35 age group accounted for 60.5% of bus passengers and 46.3% of all bicycle riders in the County. Geographically, the highest degree of bicycle use was in the Goleta, UCSB, and Isla Vista areas, where most University of California students lived. Only 4% of the 1979 labor force of about 70-75,000 commuted by bus regularly and 4.4% commuted by bicycle. Other data indicated a large extent of recreational bicycle use especially on weekends.

In order to gain more information about preferences for bicycle storage facilities and to elicit priorities for improvements to the bicycle-trailer service, surveys were conducted among three potential target groups - students, employees, and residents - between November 1978 and February 1979.[6] These surveys yielded the following results:[7]

- Bicycle-trailer services. Overall, interest in the bicycle-trailer travel mode seemed concentrated in the 10-24 age group. The general awareness and experience regarding the service was low. A substantial degree of the public did not know about the bicycle-trailer service and only 5% of the students answered that they had ever used the bicycle trailer. This is not surprising, since the SBMTD was providing only a low level of bicycle-trailer services and was not actively marketing this service. Among the students interested in using it in the future, 59% expressed a strong desire for weekend service, and 14% wanted a higher level of service.

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[6] For detailed results see: Wilbur Smith and Associates, op. cit., June 1979, pages 3-12. All survey forms are included in Appendix B.

[7] Due to extremely low response rates, these results are not statistically valid.

- Bicycle parking facilities. Whereas most residents seemed satisfied with regular racks, most students expressed a preference for high security racks that secure both wheels and the frame of the bicycle, and employees expressed the greatest interest in lockers. None of the surveyed groups indicated a demand for leased lockers. If bicycle racks were available at bus stops, 17.8% of the students stated that they would use the bus more often.

4.6.3 Marketing Strategies

SBMTD planned to overcome the public's lack of information and unfamiliarity about the service with intensive promotions during the demonstration. The first marketing campaign was launched at the beginning of the demonstration, in June 1979. It reintroduced the Bus and Bike Express and was aimed at increasing the general public's awareness of the bicycle-trailer service (see Exhibit 4.7). This campaign lasted for two months and was restricted to advertisements in local newspapers and to familiar bicycle-user locations (e.g., posters placed in bicycle shops).

This introductory effort was later followed by a six-month campaign. Starting in November 1979, SBMTD advertised three special transit services together: Bus 'n Bike (bicycle-trailer service), Bike 'n Ride (bicycle parking at bus stops), and Park 'n Ride (automobile parking at bus stops) with a "Sign Language" campaign. This involved several media, including local newspapers, radio, bus stop signs, bus cards and placards on the outside of all SBMTD buses. Exhibit 4.8 shows an example of Bus 'n Bike and Bike 'n Ride newspaper advertisements. Exhibit 4.9 shows one of the hand-outs SBMTD used to attract existing bus pass holders to the use of bicycle lockers.

As a follow-up to these marketing efforts, SBMTD produced a three-minute movie about the bicycle-trailer services, titled "Signs of the Times". A local T.V. station (Cable Channel 2) ran this film every night from June 7 to August 28, 1980.

Exhibit 4.7

INITIAL BICYCLE-TRAILER ADVERTISEMENT

Introducing America's first Bus and Bike Express

for the second time.

This is going to be a short introduction. Because you probably already met our Bus 'n Bike Express last year.

Well, it's back again. This time with a new bike trailer that provides greater ease of access for quicker loading and unloading, as well as a smoother, safer ride for your bike. For just 15¢ more than your regular fare.

So if you need a bike on campus at UCSB and you live downtown, or if you're a Goleta resident and would like to take your bike downtown on a shopping spree, the Bus 'n Bike Express is made for you.

Of course, seating preference is given to riders with bikes. And route and schedule information is available from any bus driver. Or from the Transit Center by phoning 962-7682.

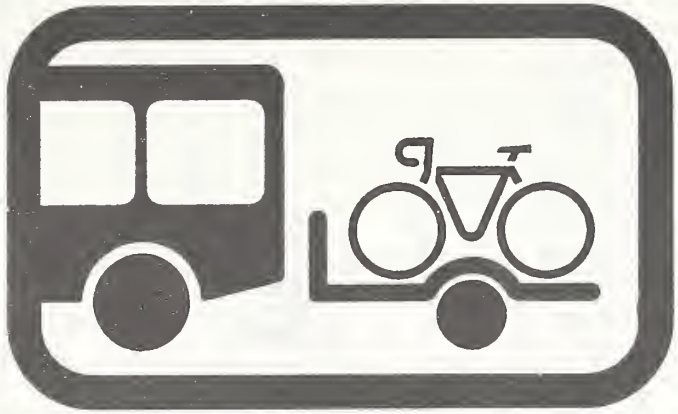
We figure that if you and our Bus 'n Bike Express get to know each other better, an introduction won't be necessary next time.

M.T.D.
We're just around the corner.

Exhibit 4.8

THE "SIGN-LANGUAGE" CAMPAIGN

Sign language.



Bus 'n Bike.

Facing the decision between bus or bike hasn't always been easy.

Bikes are a great form of exercise in Santa Barbara's temperate climate. But biking long distances can be taxing. And taking the bus used to mean arriving without the convenience of having a bike at your disposal.

MTD has changed all that.

Now you can take your bike with you on any one of the six new bike trailers. From Goleta to Summerland. Or from UCSB to Fairview Shopping Center. And lots of places in between.

Look for this new symbol. It designates bus stops where the Bus 'n Bike service is available.

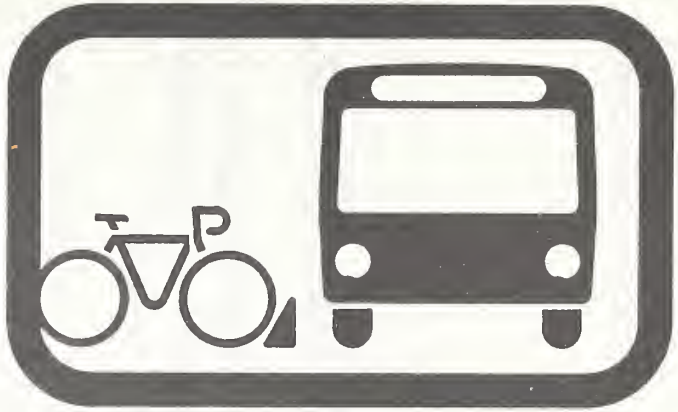
Bus 'n Bike is just one of the three new ways to make riding the bus easier. And more practical.

If you're faced with choosing bus or bike, choose both.

MTD
Signs of the times.

Call 962-7682 for route and schedule information.

Sign language.



Bike 'n Ride.

Bike riding is more than a Santa Barbara pastime.

It's an economical way to get where you're going. And it's great exercise. But a trip all the way downtown just might be overdoing it.

So MTD has installed bike-lock facilities at 25 bus stops from Goleta to Carpinteria. Complete with theft-resistant cables. All you need is your padlock.

Now you can bike to any one of the convenient Bike 'n Ride locations. And ride the bus to your final destination.

Look for this new symbol. It designates bus stops where the Bike 'n Ride service is available.

Bike 'n Ride is just one of three new ways to make riding the bus easier. And more practical.

This way you can exercise and end up where you're going without ending up out of breath.

MTD
Signs of the times.

Call 962-7682 for route and schedule information.

Exhibit 4.9

BICYCLE-LOCKER ADVERTISEMENT

Join the Club.

Holders of MTD passes are members of an exclusive group.

A monthly, sixty day, or annual pass permits them to use an enclosed bike locker at the Goleta Park 'n' Ride.

There is no additional charge for this convenience and an added protection for their bicycles.

Membership in **MTD's Bike 'n' Ride Club** is paid up so long as you are the holder of a valid pass.

Call 964-0757 for needed information and sign up today.

Santa Barbara METROPOLITAN TRANSIT District

5. LEVEL-OF-SERVICE IMPACTS

5.1 OVERVIEW

The level of coordinated bicycle-trailer and transit services changed five times over the course of the demonstration. Service levels changed in June 1979, at the start of the demonstration, with the expansion of service on Route 13; in September 1979, with the introduction of service to Routes 9 and 16; in January 1980, with the shifting of service from Route 9 to Routes 12 and 13; and in September and October of 1980, with the reroutings of Route 16. Each of these service changes are discussed in greater detail with the demand response that accompanied them in Chapter 6. This chapter examines the level-of-service impacts which the coordinated bicycle and transit services had on total travel time, including bicycle and non-bicycle users' times and distances, bicycle-trailer loading and unloading time, and on-board vehicle time. The reliability of the equipment and the safety and security of the services are also analyzed.

5.2 TRAVEL TIME

Travel time is determined by the trip length and the selected mode of transportation. The total travel time of users who coordinate bicycle and transit services consists of several components. On a one-way trip, travel time for bicycle-trailer users includes bicycle access and egress time, bicycle loading and unloading time and point-to-point travel time on the bus. This section examines each of these components and their impacts on total travel time.

5.2.1 Bicycle Access and Egress

Data pertaining to access and egress times were gathered in on-board transit passenger surveys in November 1979 and May 1980. Exhibit 5.1 shows the mean access and egress times for three groups of transit users - 1) bicyclists, passengers using a bicycle to access and egress transit service; 2) non-bicyclists, passengers walking or not using a bicycle to access and egress transit service; and 3) all passengers riding the bus. The 1979 survey combines all routes and the 1980 survey lists individual routes.

Overall, there was almost no difference in egress times between bicyclists and non-bicyclists, with times ranging between 6.8 and 8.6 minutes in 1979 and 1980. Without detailed origin and destination data for individual passengers it is difficult to explain exact subgroup

Exhibit 5.1

ACCESS AND EGRESS TIMES

Routes	Access Time			Egress Time		
	Bicyclists [1]	Non-Bicyclists [1]	All Passengers	Bicyclists	Non-Bicyclists	All Passengers
All Routes [2] (1979)	13.8 (n=65)	7.0 (n=158)	7.7 (n=738)	7.5 (n=65)	6.8 (n=158)	7.9 (n=713)
All Routes [2] (1980)	16.6 (n=173)	8.2 (n=692)	9.9 (n=923)	8.5 (n=168)	8.6 (n=670)	8.6 (n=895)
Route 12 (1980)	5.0 (n=2)	7.8 (n=71)	7.6 (n=74)	(n=0)	9.1 (n=66)	9.0 (n=67)
Route 13 (1980)	16.9 (n=135)	8.2 (n=417)	10.3 (n=592)	9.5 (n=130)	9.0 (n=409)	9.1 (n=579)
Route 13 B (1980)	10.2 (n=17)	8.8 (n=58)	8.9 (n=79)	6.5 (n=17)	5.6 (n=53)	5.8 (n=74)
Route 16 (1980)	21.6 (n=19)	8.2 (n=146)	9.8 (n=178)	3.7 (n=21)	8.5 (n=142)	7.7 (n=175)

[1] Bicyclists: Passengers using a bicycle for both access and egress.
Non-Bicyclists: Passengers walking to and from the bus stop for 1979 data; passengers not using a bicycle for either access or egress for 1980 data.

[2] Routes 8, 9, 13, and 16 combined for 1979; Routes 12, 13, 13 B, and 16 combined for 1980.

Source: On-board bike/bus rider surveys, 1979 and 1980.

differences. Access times of bicyclists (13.8 and 16.6 minutes) were about twice as long as those of non-bicyclists (7.0 and 8.2 minutes) both in 1979 and 1980. These findings indicate bicyclists may be willing to spend more time getting to transit service than other passengers.

Assuming an average bicycle speed of 10-12 miles per hour and an average walk speed of 2-2.5 miles per hour, the average access distance for bicyclists was about 2.5 miles, whereas the average access distance for non-bicyclists was about one-third of a mile. The corresponding average egress distances were about 1.5 miles for bicyclists and again one-third of a mile for non-bicyclists. It thus appears that the Santa Barbara bicycle-trailer transit service was successful in extending coverage to bicycle users beyond the walk access limits.

5.2.2 Bicycle Loading and Unloading

A separate study of bicycle loading and unloading times on the bicycle-trailer was conducted on weekday afternoons in February 1981. SBMTD observed a total of 17 individuals of both sexes and different age groups. The number of observations was not large enough to make any conclusions concerning time differences, however, some hypotheses are suggested:

- The average time spent loading and unloading a bicycle on a trailer was 33.68 seconds. Fastening the bicycle to the trailer required between 10 and 35 seconds, or approximately twice as much time as removing it (between 8 and 15 seconds). A typical loading process is shown in Exhibit 5.2.

- Related to this, bicyclists usually encountered more problems in loading their bicycles than in unloading them. A typical loading problem was that the bicycle did not fit into the tie-down rack immediately. Sometimes during unloading, bicycles stuck to the rack or to other bicycles.

- Earlier assumptions were that very young or very old passengers might require more time because they need additional assistance. This was not indicated by the observations.

5.2.3 Transit Time

Data pertaining to travel speeds of minibuses with and without bicycle-trailers were unavailable. Therefore, changes in bus transit time cannot be determined exactly. However, since the average amount of time the sample group spent loading and unloading each bicycle was less than one minute, it is assumed that all riders will be able to load and

Exhibit 5.2

BICYCLE LOADING SEQUENCE

Average Loading Time: 22.48 seconds

unload their bicycles on the trailer and board and disembark the bus in about one minute.

Using this estimate of one minute, the average number of trailer paratransit passengers with bicycles of 110 per day and assuming this level for 30 days per month, the bicycle-trailer service is estimated to add at most about 55 more vehicle hours of service per month. Based on a 1980-1981 annual level of service of 15,600 bicycle-trailer vehicle hours, the bicycle-trailer could thus increase overall route running time by about four percent. This time analysis is shown in the following calculations:

> 110 bicycle-trailer users per day x 30 days per month x 1 minute for loading and unloading / 60 minutes per hour = 55 additional hours per month
>
> 55 hours x 12 months / 15,562 bicycle-trailer hours per year = 4.2 percent increase.

This estimate is lower than that of local SBMTD drivers. The SBMTD bus drivers estimated that the total time spent loading and unloading bicycles at bus stops added about 5 minutes to each hour of running time, or an 8.3 percent increase in travel time. However, since bicycle-trailers were used on express routes and along freeways where it is easier to make up time, it is assumed that the actual time difference between minibuses with and without trailers was not significant. In fact, in many cases layover times between runs can accomodate minor increases in running time. Actual vehicle platform hours may therefore not change or may only increase slightly.

5.2.4 Summary

The coordination of bicycles and transit services seems to be an effective way of increasing transit coverage. The access times and distances of bicyclists and non-bicyclists using the trailer services were substantially different. Bicyclists are willing to spend about twice as much time to bike almost eight times farther to reach their desired transit stop.

The amount of time spent loading and unloading a bicycle on the trailer was about 34 seconds. Loading was about twice as time-consuming as unloading. Overall, this may have resulted in up to a four percent increase in transit running time on bicycle-trailer routes.

5.3 EQUIPMENT RELIABILITY

5.3.1 Pre-demonstration Trailers

The SBMTD designed the six demonstration bicycle-trailers to avoid many of the defects associated with the first two trailer models. In fact, it was the earlier trailers' poor reliability record that was often blamed for the low use of the bicycle-trailer services.

5.3.2 Demonstration Trailers

Originally, the demonstration trailers were wired for standard American tail and directional lights. But, they had to be coupled with German Mercedes minibuses. Thus, all the trailers had to be rewired before the demonstration services could begin.

The bicycle-trailer tie-downs had rubber straps which needed to be pulled to hold the bicycle tire securely. Bicyclists often applied too much strength, causing the straps to break. As a result, the rubber straps needed constant replacement, at a rate of approximately 10 per week for the entire fleet of trailers.

Other regular maintenance of the trailers included replacement of tires (about 2 per month) and leaf springs (about 6 per year), and repair of wheel bearings (about 1 per week) and trailer hitches (about 1 per month). The maintenance records for all bicycle-trailers between February and June 1980 showed a total average of 14 hours of labor per month. The respective costs associated with regular trailer maintenance are listed in Exhibit 6.2 in the Economics and Efficiency chapter of this report. In summary, the demonstration bicycle-trailers required regular maintenance but did not pose a major reliability problem.

5.3.3 Racks, Lockers and Minibuses

The SBMTD did not report any bicycle rack or locker maintenance cost. Concerning maintenance on the minibuses, no definite decision could be made as to whether or not they required more repair work during bicycle-trailer operations. The SBMTD frequently exchanged minibuses and trailers to the various routes with no apparent problems.

5.4 SAFETY AND SECURITY

5.4.1 Overview

Users must perceive the bicycle-trailers, racks and lockers as safe, secure, and easy-to-use, if they are to be effective. SBMTD drivers were responsible to supervise the loading and unloading of bicycles to make sure that bicycles were safely fastened to the trailer and to avoid other accidents. All bicycle-trailers were covered by liability insurance. Users' perceptions of the probability and potential causes of personal or property damage in connection with the new services were compiled from student surveys, on-board Bus 'n Bike-user surveys, bicycle rack user surveys, accident reports and SBMTD records. Some user attitudes on the safety and security of services are indicated in Section 6.6.3. In addition, thirty-two incidents related to the bicycle-trailer service were reported from May 1978 to September 1980. They can be grouped into three categories: Bicycle-trailer accidents, personal injuries and bicycle damages. Eight bicycle-rack incidents were also reported.

5.4.2 Bicycle-Trailer Accidents

Of the four accidents reported, one did not involve any damage. In two of the remaining cases (September and October 1978) the trailer's tail lights were hit and had to be replaced. In July 1979, a trailer hitch was damaged when the vehicle passed a dip in the street.

5.4.3 Personal Injuries and Dangerous Incidents

A total of 5 personal injuries or dangerous occurences were reported, although no claims were filed. In the 1979 and 1980 on-board surveys two passengers stated that they had almost been run over by the bicycle-trailer and one passenger indicated he was almost left at the stop without his bicycle, because the bus started moving before he had unloaded his bicycle. In February 1980, a bicyclist reported a slight injury from a bicycle rack that had not been properly stowed. In August 1980, a passenger twisted an ankle stepping off a trailer.

5.4.4 Bicycle Damages

Most incidents reported were bicycle damages. Only 4 of the 27 reported incidents resulted in the filing and payment of a claim. Two cases (in October 1978 and December 1979) involved damaged bicycle rims. In March 1980, a bicyclist was paid for a blown tire by the SBMTD. A faulty tie-down strap on a bicycle-trailer caused a bicycle to fall off in September 1980.

The other complaints about bicycle damages included incidents of bicycles falling off the trailer (8 cases), warped rims (4 cases), bent

wheels (3 cases), torn tires (4 cases), chain and gears falling off (2 cases), scratched paint (2 cases), and tape torn off the handlebars (1 case). The main causes of these problems seemed to be: (1) improperly secured bicycles, (2) faulty or damaged bicycle trailer tie-downs, (3) the movement and bounce of the trailer, and (4) the contact between bicycles during the ride and the loading/unloading process.

5.4.5 Bicycle Rack Accidents

Bicyclists also reported accidents at the bicycle racks provided at bus stops throughout the Transit District's service area. There are no records of claims filed from any of these accidents. And, only one of the eight cases described in the 1979 and 1980 bicycle rack user surveys referred to a personal injury. The respondent had been "poked, scraped, scratched from trying to get bike out of a heap of other bikes". The other bicycle rack incidents included deflated or slashed tires (3 cases), bicycles falling over (2 cases), scratched paint (1 case), insufficient space (1 case) and bicycle theft (1 case). The major causes of these incidents stemmed from vandalism and overcrowded bicycle storage facilities, also reflected in the large number of survey respondents' comments who asked for additional bicycle racks.

5.4.6 Summary

In general, the Santa Barbara bicycle-trailers, racks and lockers were safe and secure. This is indicated by the low incident rate reported in the SBMTD records and the bicycle rack user surveys. Over the two-year demonstration period, only 40 incidents were reported. Most incidents involved minor bicycle damages and no personal injury claims were filed.

6. TRAVEL BEHAVIOR

6.1 OVERVIEW

The primary purpose of this demonstration was to increase transit ridership. Thus, the demand response to the coordinated bicycle and transit services is a major factor in this evaluation. Ridership counts, rack counts and survey information were collected to analyze changes in transit demand during the demonstration and to identify some of the major factors which caused these changes.

6.2 DATA AND ANALYSES

The first section of this chapter examines the development of paratransit ridership (passengers and bicycles using the minibus trailer service) during the demonstration period. It is compared to total SBMTD system ridership and to special demand patterns, like weekday-versus-weekend and seasonal fluctuations. Ridership counts reported by the bicycle-trailer bus drivers and the SBMTD system ridership estimates are used in this analysis.

Some of the counts on the paratransit routes were incomplete because drivers did not always remember to fill in their counting sheets and for four months (June, September, and December 1980 and January 1981) no daily paratransit ridership counts were available. For these months the daily averages were calculated as approximations from the monthly estimates, although these averages tend to be too low for comparable weekday ridership and too high for comparable weekend data. For the month of May 1980, almost no data were available, because SBMTD changed to computerized analysis and storage of operating statistics. Because much of these data are missing or incomplete, the scope of the demonstration ridership analysis is limited. In addition to ridership counts, this first section also examines the use of the SBMTD bicycle racks and lockers and whether new users were attracted to SBMTD services during the demonstration.

The remainder of the demand analysis chapter presents results of a number of surveys conducted before or during the demonstration. Individual sections pertain to user and non-user characteristics, trip characteristics and user and non-user attitudes. The following surveys are included in the analysis:

- "On-board survey 1978":[1] System-wide on-board passenger survey conducted in April 1978 (11,102 responses);

- "On-board survey 1979" and "On-board survey 1980": Bicycle-trailer surveys conducted on November 7-9, 1979 (772 responses) and May 9-10, 1980 (1,205 responses);

- "Bike rack users 1979" and "Bike rack users 1980": Bicycle rack facility user surveys conducted on November 7-9, 1979 (18 responses) and May 9-10, 1980 (19 responses);

- "All students 1979": UCSB and Westmont College student opinion surveys conducted on November 7-9, 1979 (488 responses);

- "Households 1980": General household telephone survey conducted in the SBMTD service area on May 12-24, 1980 (601 responses, sampled from the 93017, 93101, and 93110 zip codes);

- "Employees 1980": Santa Barbara County Office Building employee survey conducted on May 29, 1980 (186 responses);

- "Bike path users 1979": Bicyclist and pedestrian Cabrillo Boulevard Bikeway survey conducted on August 15, 1979 (269 responses).

Copies of the survey forms and complete tabulations of the survey results are contained in Appendix B. Separate tabulations in this chapter summarize the results referring to the major issues of the discussion. For all questions permitting multiple responses the results are tabulated for the first response due to the constraints imposed by the availability and comparability of the data. An examination of all responses in those cases showed that the additional information from the multiple responses would not cause significant changes in the overall results.

6.3 USE OF BICYCLE-TRAILER PARATRANSIT SERVICES AND BICYCLE STORAGE FACILITIES

6.3.1 Weekday Ridership

Before the Demonstration

Before the Santa Barbara Metropolitan Transit District implemented the demonstration services they operated bicycle-trailer paratransit services on one route. Route 13 provided weekday service from 7:00 a.m. to 7:00 p.m. between the University of California at Santa Barbara

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[1] The expression in quotation marks is the abbreviation used for each survey in the exhibits.

(UCSB) and the Santa Barbara Central Business District on 30-minute headways. Two vehicles were used to provide this service although only one was equipped with a bicycle-trailer, so that bicycle-trailer services operated every 60 minutes. In April 1978, Route 13 carried 330 daily riders. Another count on November 20, 1978, shows a decline to 153 daily passengers and about seven percent of these riders used the bicycle-trailer component. Between January and June of 1979, the SBMTD cut back service on Route 13 to hourly bicycle-trailer service.

The Demonstration Begins

With the start of the demonstration on June 18, 1979, service on Route 13 introduced:

- Prolonged weekday hours from 6:00 a.m. to 9:00 p.m.;
- New weekend service on Saturdays from 8:00 a.m. to 9:00 p.m. and on Sundays from 10:00 a.m. to 6:00 p.m.;
- A new trailer and a second minibus, with the old trailer serving as back-up in case of breakdowns; and
- New service to Summerland, about 7 miles east of downtown Santa Barbara.

Bicycle-trailer services still operated hourly. However, two vehicles were used to cover the longer route, and two trailers were available, to insure more reliable bicycle-trailer services. Ridership increased markedly during the first three months of the demonstration. Average weekday ridership rose to 308 passengers in August, including 73 passengers with bicycles on the trailer. This increase is especially remarkable as Santa Barbara usually experiences a seasonal ridership decline in August. Average weekday bicycle-trailer paratransit route ridership figures over the course of the demonstration are indicated in Exhibit 6.1. Exhibit 6.2 presents the combined ridership on Routes 13 and 16.[2]

September 1979 Changes

In September 1979, SBMTD again extended bicycle-trailer services by adding two other routes. They deployed one trailer on Route 9 (UCSB -- Airport -- Fairview Center) and one trailer on Route 16 (Westmont College -- Coast Village Road). Due to low bicycle usage Route 9's bicycle-trailer services terminated in early December 1979, after approximately 10 weeks of operation.

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[2] Continuous data were not available on the other bicycle-trailer routes.

Exhibit 6.1

AVERAGE WEEKDAY RIDERSHIP ON BICYCLE-TRAILER ROUTES

Demonstration Activities	Month	Routes * All 1	All 2	# 12 1	# 12 2	# 16 1	# 16 2	# 13+ 1	# 13+ 2	# 13B+ 1	# 13B+ 2	# 26+ 1	# 26+ 2	# 27+ 1	# 27+ 2
	1979														
Demonstration began →	June	120	31					120	31						
	July	172	52					172	52						
	August	235	73					235	73						
Route 16 introduced →	September	401	101			189	13	212	88						
	October	403	104			148	9	255	95						
	November	411	76			134	9	277	67						
	December	395	54			138	10	257	54						
	1980														
Route 12 and Route 13B → introduced	January	553	62	101	4	138	9	254	42	60	7				
	February	688	96	128	2	142	14	334	71	84	9				
	March	653	89	114	2	128	13	323	63	88	11				
	April	347	71	N.A.		105	10	160	43	82	18				
	May	N.A.		N.A.		N.A.		N.A.		N.A.					
	June	413	106	N.A.		80	11	333	92	N.A.					
	July	477	129	N.A.		113	16	364	108	N.A.					
	August	397	120	N.A.		106	14	291	99	N.A.					
Route 13 split into Routes 13 and 26 and Route 13B changed to Route 27	September	554	114	N.A.		181	15	171	44			117	33	85	16
	October	713	166	106	6	172	23	154	33			174	82	107	22
	November	720	174	126	7	167	21	150	41			173	85	104	20
Demonstration ended →	December	489	107	N.A.		125	14	144	30			135	45	85	14
	1981														
	January	585	118	N.A.		173	16	168	34			161	63	83	4

Legend:

* Includes only runs with bicycle-trailers, but does not include Route 9, operated in October and November of 1979, or Route 8, operated in December 1979 and January 1980.

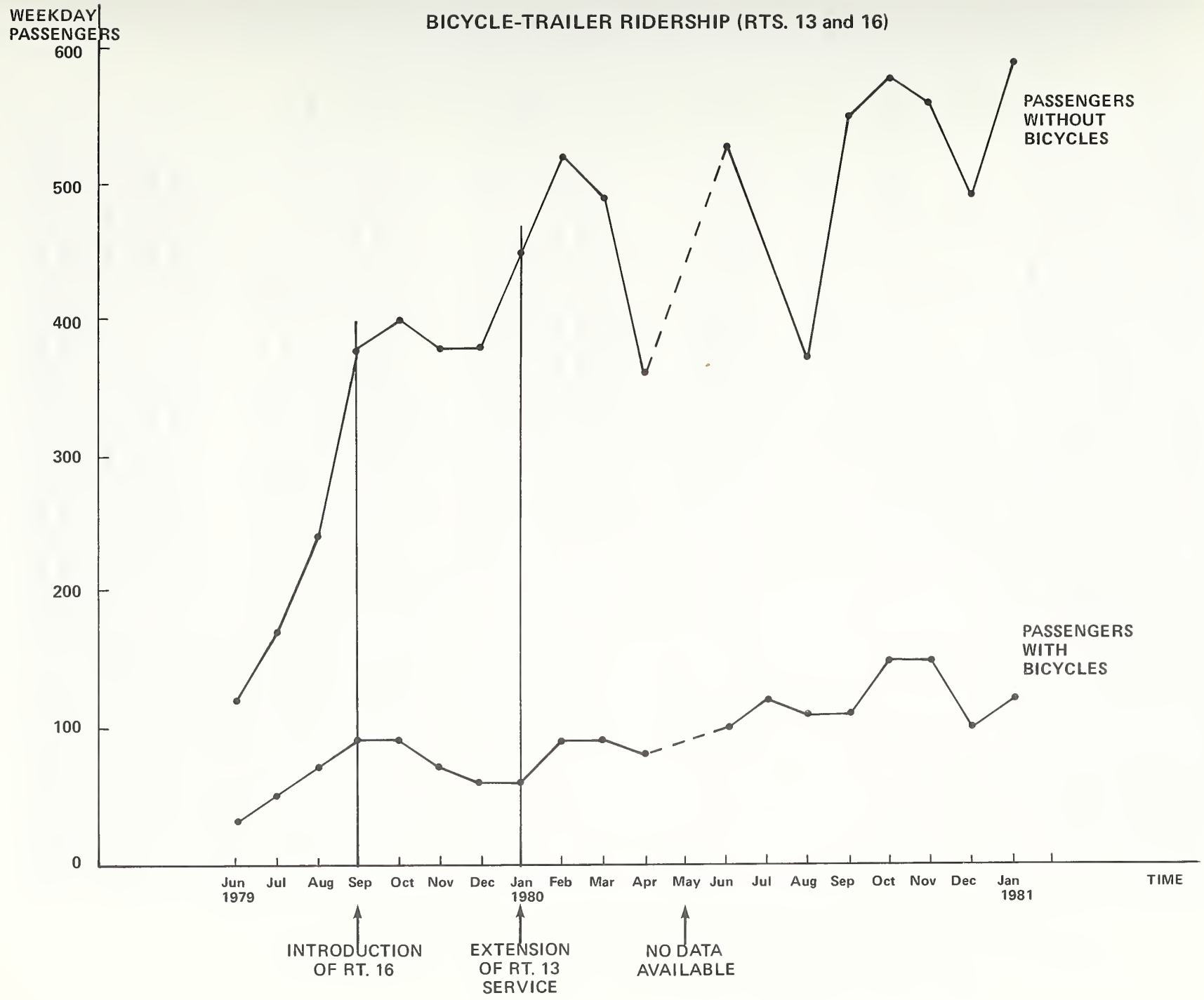
\+ All operate along the same route.

1 Passengers without a bicycle on the trailer.

2 Passengers with a bicycle on the trailer.

N.A. Counts not available.

Exhibit 6.2


BICYCLE-TRAILER RIDERSHIP (RTS. 13 and 16)
WEEKDAY PASSENGERS
600
500
400
300
200
100
0
PASSENGERS WITHOUT BICYCLES
PASSENGERS WITH BICYCLES
Jun 1979
Jul
Aug
Sep
Oct
Nov
Dec
Jan 1980
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Jan 1981
TIME
INTRODUCTION OF RT. 16
EXTENSION OF RT. 13 SERVICE
NO DATA AVAILABLE

Route 9 offered 30-minute service on weekdays from 6:00 a.m. to 8:00 p.m. and on Saturdays from 7:00 a.m. to 8:00 p.m. with hourly service on Sundays from 9:00 a.m. to 7:00 p.m. Route 9 was mainly patronized by UCSB students for school and shopping trips; 70 percent of all 1979 survey respondents on Route 9 checked either "school" or "shopping" as their trip purpose. Bicycle-trailer use on Route 9 averaged less than 1 percent of its total passengers on weekdays. This is probably because Route 9 was 3 miles long without express service, and bicyclists could make the same trip more quickly and conveniently by bicycling the entire distance.

Route 16 was considerably more successful. Route 16 mainly served Westmont College students traveling from downtown Santa Barbara, operating half-hourly on weekdays from 7:00 a.m. to 6:00 p.m. and on Saturdays from 9:00 a.m. to 5:00 p.m. From September to December 1979, ridership on Route 16 averaged 160 weekday passengers, with about 6% of these passengers transporting their bicycles on the trailer.

January 1980 Changes

Four months later, on January 21, 1980, new service changes on bicycle-trailer paratransit routes were implemented. SBMTD initially shifted the Route 9 trailer to Route 8 for less than two months between December and January. Then, in January, the trailer was shifted to Route 13 and Route 12.

On Route 13, it provided booster service between UCSB and downtown, hourly on weekdays from 7:00 a.m. to 10:00 a.m., and from 3:00 p.m. to 6:00 p.m., to accomodate the increased peak period demands. This service was called Route 13B. The same trailer switched tc Route 12 (Goleta -- Santa Barbara Express) during the mid-day period on weekdays between 10:00 a.m. and 3:00 p.m. SBMTD also introduced bicycle-trailer services into Carpinteria, a newly annexed MTD area, with a second extension of Route 13.

SBMTD operated this level of service for eight months, until September 1980. During that time, the total number of weekday bicycle-trailer paratransit riders reached a peak in February 1980 with 784 passengers, and in July 1980 with 129 bicycle passengers, of which 108 were observed on Route 13 alone. On Route 12, passengers with bicycles increased from 4 per weekday in January 1980 to 7 per weekday in November 1980, and on Route 16 from an average of 10 per weekday in 1979 to 14 per weekday in June through August of 1980.

September 1980 Changes

In September 1980, the SBMTD introduced their final demonstration service changes for the bicycle-trailer paratransit routes. Route 13 was split into Route 13 (Downtown Santa Barbara -- Carpinteria) and Route 26 (UCSB -- Downtown Santa Barbara), and Route 13B was renamed Route 27. These modifications did not involve any changes in the level of service. Route 16 was rerouted to provide service to Westmont College Apartments, the Brooks School of Photography, and convenient

transfers to Route 2. Service to the Brooks School of Photography, however, was terminated in October 1980, as the projected demand did not materialize.

During the last four months of the demonstration, bicycle-trailer paratransit ridership reached its highest point. In November 1980, the largest number of passengers and bicycles used the services: an average of 720 passengers each weekday plus an additional 174 passengers with bicycles each weekday (894 total passengers per weekday). Weekday bicycle counts from September through December 1980 averaged 6 on Route 12, 116 on Route 13, and 18 on Route 16.

Summary

To summarize, the following ridership trends were observed during the demonstration:

- Overall ridership. Bicycle-trailer paratransit ridership rose from June 1979 to a maximum in November 1980. This trend is illustrated in Exhibit 6.1. Between November 1978 and November 1979, ridership rose 218 percent from a pre-demonstration level of 153 to 487 passengers after six months of demonstration services. During the same period, bicycle-trailer services had increased about 205 percent. In the course of the demonstration, between November 1979 and November 1980, ridership increased 84 percent, while the level of service increased about 23 percent.

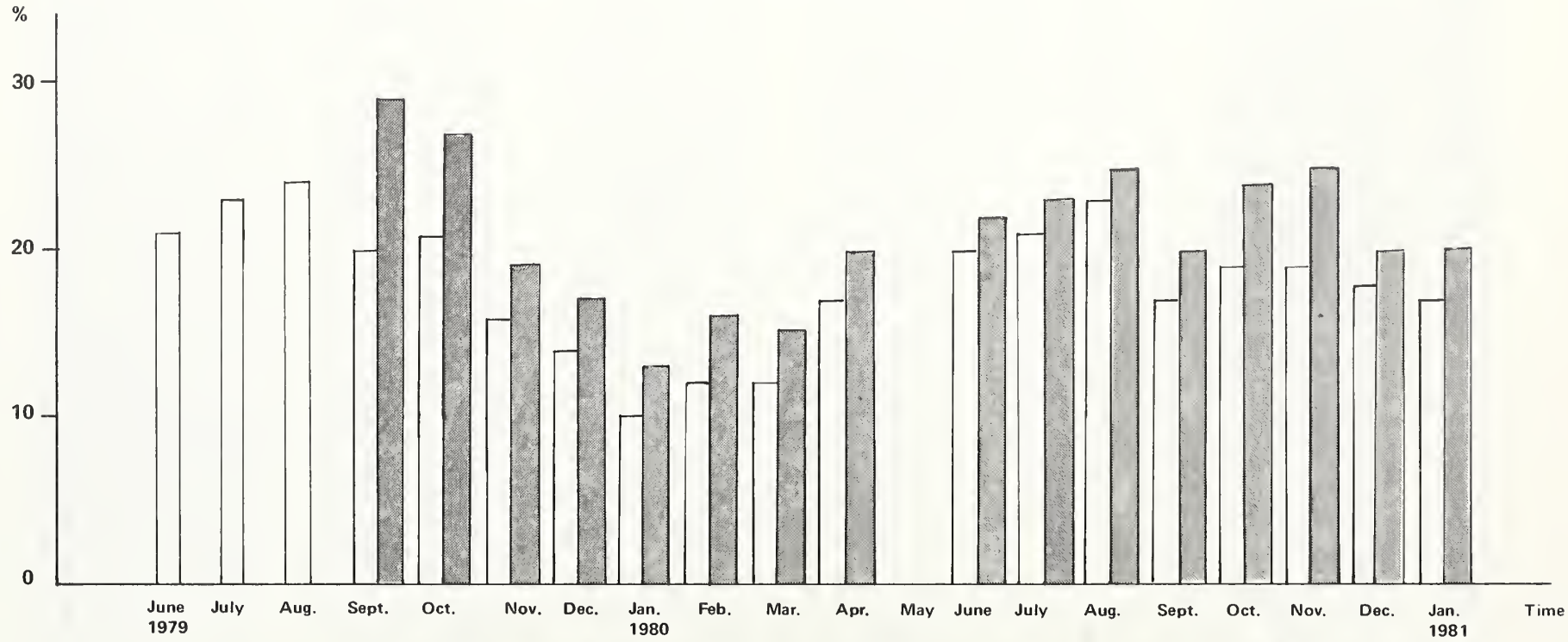
- Passengers with bicycles. The number of bicycle-trailer paratransit passengers with bicycles increased more dramatically. In November 1978, only 11 bicycles per weekday were counted on the bicycle-trailer. By November 1979, seven times as many passengers were using the service. From November 1979 to November 1980, the average number of weekday passengers with bicycles increased by 129 percent from 76 to 174. The level of bicycle-trailer services increased 23 percent, as described above.

- Passengers with bicycles as percent of total riders. The number of passengers with bicycles as a percentage of total bicycle-trailer weekday riders averaged 20 percent. This comparison is presented in Exhibit 6.3. The percentage was lower during the months of December through March which may be attributed to seasonal effects. This ratio was consistently higher on Route 13, reflecting the high level of demand for bicycle-trailer services on this route.

- Comparison among routes. Comparing bicycle-trailer paratransit ridership among the routes involved in the demonstration, Route 13 turned out to be the most successful, regarding the absolute level, growth, and percent share of bicycle ridership. Ridership increased 125 percent between November 1978 and November 1979, and 67 percent in the following year, during which the level of service was raised by about 17 percent. The number of weekday passengers with bicycles on Route 13 increased 118 percent from 67 to 146 between November 1979 and November 1980. Due to increasing demand,

Exhibit 6.3

BICYCLE-TRAILER ROUTES: PASSENGERS WITH BICYCLES AS PERCENT OF TOTAL WEEKDAY RIDERS



All bicycle-trailer routes, including:

Route 12 (Jan.-March 1980, Oct.-Nov. 1980)
Route 13 (June 1979-Jan. 1981)
Route 16 (Sept. 1979-Jan. 1981)

Route 13 only, including Routes 13B, 26, 27

service on Route 13 was extended several times during the demonstration. This development may be due to the fact that SBMTD ridership was growing in general and Route 13 was an express route, which attracted more riders. Also, the route's layout met the travel demands of special user groups who were willing to combine bicycle and transit as their main mode of local travel. This issue is further explored in Section 6.4.

6.3.2 Bicycle-Trailer versus Total System Ridership

This section evaluates the bicycle-trailer paratransit ridership increases relative to the ridership trends of the entire SBMTD system. The increases in bicycle-trailer ridership can then be separated according to whether they represent the overall trend of the system or whether they represent effects of the demonstration. Exhibit 6.4 presents daily ridership figures for Routes 13 and 16 combined and for the total SBMTD system.[3] The corresponding ridership growth rates are also shown on the bottom of Exhibit 6.4. Bicycle-trailer paratransit ridership accounts for only about 3-5 percent of the total daily SBMTD passengers. These routes generally reflect total system ridership changes.

A comparison of the growth for the last quarter of 1980 with the last quarter of 1979 can isolate the effects of the introduction of expanded bicycle-trailer services.

- From October through December 1979 to October through December 1980, the number of passengers with bicycles increased by 70%, reflecting a strong demand for this special kind of service;
- During the same period, total ridership on Routes 13 and 16 increased by 46% (passengers without bicycles alone by 41%), which is considerably higher than the total system growth of 15%, while the level of service provided on Routes 13 and 16 increased by only about 19 percent during the same time (Route 13B booster service).

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[3] In this case, no weekday-weekend distinction is made because weekend data for total system ridership were not available for the entire demonstration period.

Exhibit 6.4

COMPARISON OF BIKE-BUS AND SYSTEM RIDERSHIP GROWTH

Month	Average Daily Ridership		
	Bike-Bus Routes (Routes 13 and 16)		Total System[1]
	Passengers	Bicycles	
1979			
June	141	30	13,633
July	199	43	15,567
August	186	38	15,097
September	466[2]	85[2]	15,733
October	490	94	15,548
November	452	73	15,267
December	444	63	14,500
1980			
January	508	58	17,833
February	605	85	17,241
March	581	88	18,710
April	435	77	16,400
May	613	N.A.	18,742
June	630[3]	103[3]	16,934
July	572[3]	124[3]	16,200
August	478[3]	113[3]	14,420
September	662	108	17,499
October	729	145	18,690
November	707	145	15,833
December	592	103	17,467
1981			
January	702	117	19,475
Increase last quarter 1980 versus last quarter 1979	+46%	+70%	+15%

[1] Figures for June 1979 through May 1980 are estimates.
[2] Route 16 was introduced in September 1979.
[3] Ridership data for Route 13 B missing.

6.3.3 Seasonal Influences on Ridership

This section examines the impacts of seasonal influences on the number of passengers with and without bicycles on bicycle-trailer paratransit routes and on total system ridership. Exhibit 6.5 depicts the fluctuations in average daily passengers for Routes 13 and 16 combined and for the total SBMTD system, along with climatological data[4] for each month of the demonstration. This comparison indicates:

- The overall patterns for Route 13 and 16 and total system ridership seem to be similar, characterized by marked ridership declines in April, August, and December, and peaks in February, March, September, and October;

- As shown in Exhibit 6.2, on Routes 13 and 16 the number of passengers with bicycles exhibited the same ridership fluctuation pattern as non-bicycle passengers;

- Comparing this pattern to the corresponding weather data does not reveal a significant relationship. Only the decreased share of bicycles relative to total ridership in the months of December through March (see Exhibit 6.3) seems to relate to the rainfall and decreased temperatures during this period. In the Cabrillo bike path user survey conducted in August 1979, 49% of the respondents stated that they would not use their bicycle in rainy weather.

- Considering, on the other hand, the large share of students among paratransit users (60%) and bicycle-trailer users (63%), school holidays appear to be a better explanation for the seasonal ridership fluctuations. The low peaks correspond with the spring (Easter), summer (recess) and winter (Christmas and New Year) holidays, and the high peaks reflect the resumption of classes, especially in the fall, at the beginning of the academic year.

6.3.4 Weekday versus Weekend Ridership

Different trip purposes can be assumed for weekdays versus weekends, with a significantly greater volume of work trips during the week and more recreational trips on Saturdays and Sundays. This analysis can help in understanding the type of trips attracted to the bicycle-bus service combinations. The following section separates weekday and weekend ridership to evaluate the general ridership increase on bicycle-trailer paratransit routes, its comparison to total system ridership growth, and the influences of seasonal factors.

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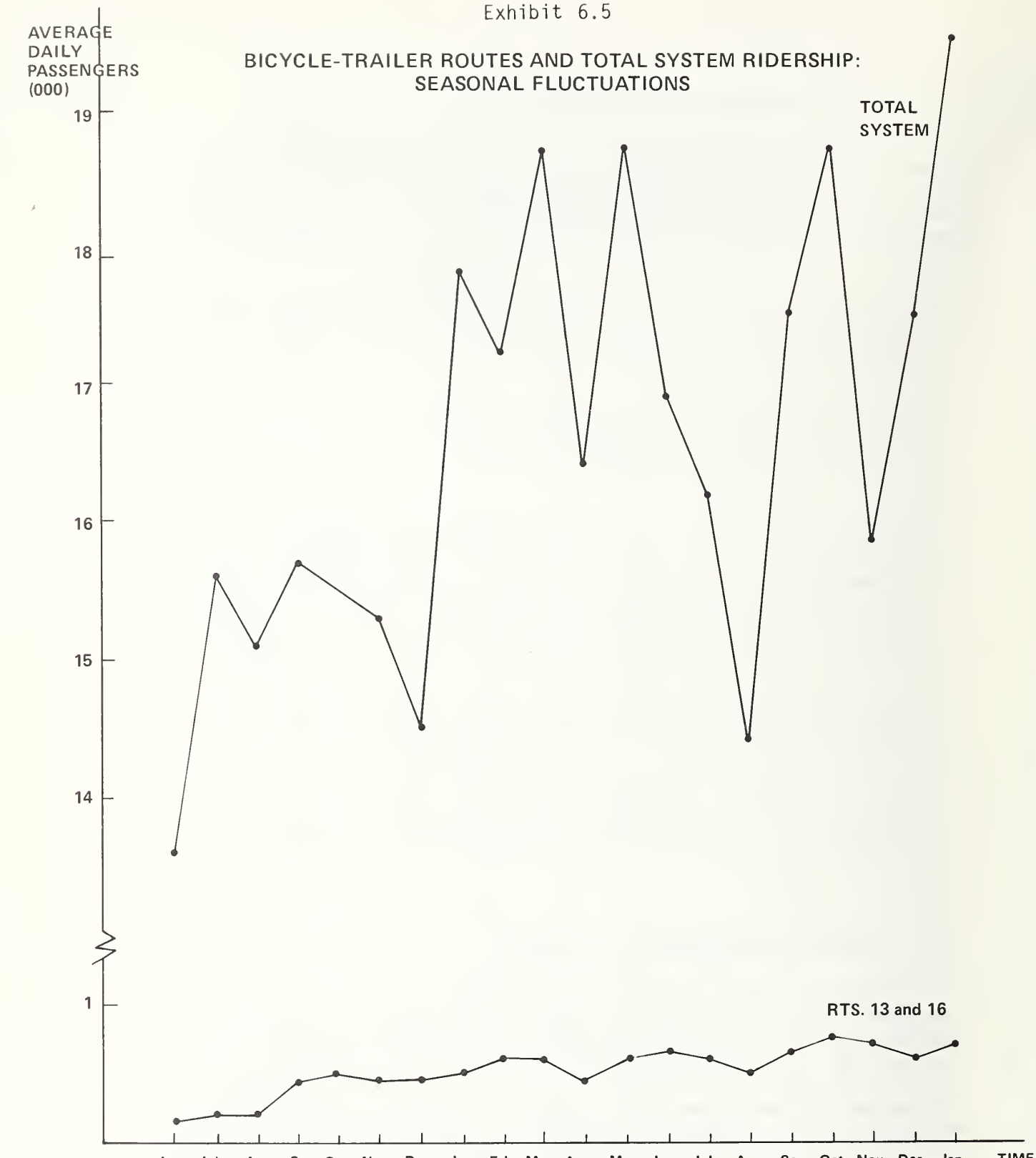
[4] Temperatures and precipitation measured at Los Angeles International Airport derived from U.S. Department of Commerce, Local Climatological Data, June 1979 to January 1981.

Exhibit 6.5

BICYCLE-TRAILER ROUTES AND TOTAL SYSTEM RIDERSHIP:
SEASONAL FLUCTUATIONS



	Jun 1979	Jul	Aug	Sep	Oct	Nov	Dec	Jan 1980	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan 1981
AVERAGE MONTHLY TEMPERATURE (°F)	69	68	71	74	66	61	61	60	61	58	61	60	66	69	71	67	66	62	60	60
RAIN (TOTAL in.)	T	0	T	.04	.31	.22	.42	6.97	9.13	3.69	.17	.07	T	0	0	T	T	0	1.57	1.51

T = TRACE AMOUNT

- Just as weekday ridership, the number of passengers and bicycles on Saturdays and Sundays increased during the demonstration period. A comparison of figures for the last quarter of 1980 to the same time in 1979 (see Exhibit 6.6 for all weekend figures) shows the greatest change in Sunday ridership -- +35% for passengers with and without bicycles. The corresponding Saturday growth rates were +26% for passengers with bicycles, and +6% for passengers without bicycles. The level of weekend services had remained unchanged over this period. These growth rates reflect improved trailer reliability coupled with a higher transit demand for recreational trips, in response to greater emphasis on health and environmental consciousness.

- The seasonal patterns of weekend ridership are similar to weekday ridership for passengers without bicycles, but different for riders with bicycles on the trailer. Exhibit 6.7 graphs bicycle-trailer ridership for passengers with and without bicycles on weekdays, Saturdays and Sundays. The figures for passengers without bicycles show primarily the same dips as weekday ridership, corresponding to the major school holidays. Passengers with bicycles seem to be more weather-oriented: ridership is lower during the rainy months of January and February and higher during the summer, reaching a maximum volume in July and August. This reflects the fact that recreational trips are choice trips, and a different choice is made when the weather is inclement.

- Thus, weekend ridership on bicycle-trailer paratransit routes in Santa Barbara appears to be influenced by two major exogenous factors: holiday patterns and weather conditions. These lead to different fluctuations depending on the predominant trip purposes of passengers with and without bicycles.

6.3.5 Use of Bicycle Storage Facilities

SBMTD installed 150 bicycle racks at bus stops throughout the service area. This would enable more passengers to access existing transit routes -- especially potential users, who live further than a comfortable walking distance from a bus stop. To provide increased security, SBMTD also installed 24 bicycle lockers at the Goleta Transit Center in December 1979.

Use of these facilities was monitored continuously during the demonstration, using a rotating-day method to obtain counts for all days of the week. Exhibit A.2 in the Appendix details the level of useage at all rack locations; the results are summarized in Exhibit 6.8. The major findings indicate:

- The racks at both transit centers and at Storke/Hollister (which is a bus stop widely used by UCSB students) received considerable use. The other locations were rarely used. This is surprising because

Exhibit 6.6

BICYCLE-TRAILER RIDERSHIP ON WEEKDAYS VS. WEEKENDS

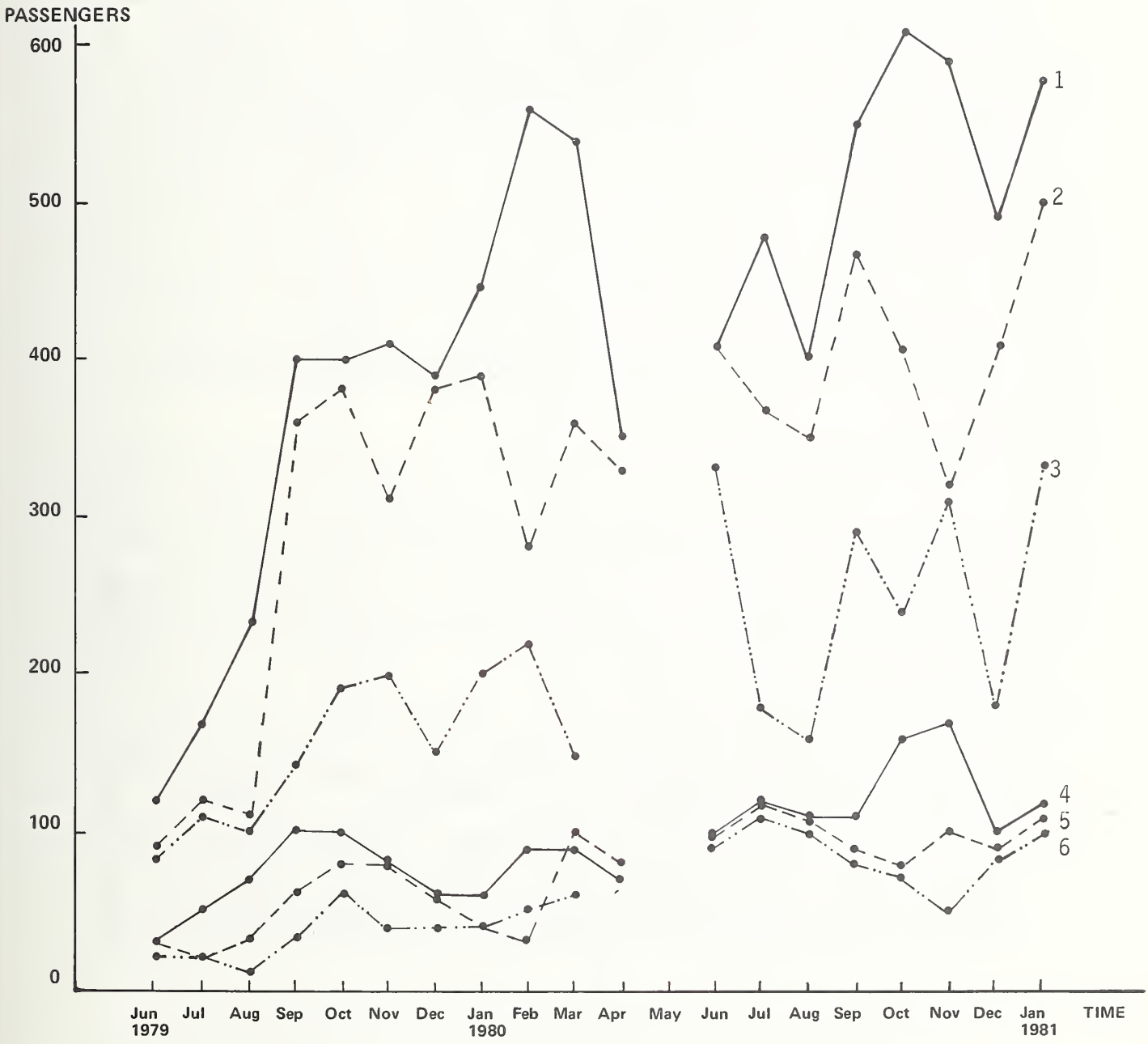
Month	Passengers without Bicycles			Passengers with Bicycles		
	Weekdays	Saturdays	Sundays	Weekdays	Saturdays	Sundays
1979						
June	120	87	80	31	28	19
July	172	124	112	52	19	21
August	235	110	98	73	28	14
September	401	362	142	101	57	28
October	403	381	193	104	76	55
November	411	313	201	76	80	41
December	395	375	151	64	61	44
1980						
January	452	387	195	58	38	40
February	560	277	224	94	35	48
March	539	362	147	87	101	58
April	347	333	N.A.	71	83	N.A.
May	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
June [2]	413	413	333	103	103	92
July	477	374	183	124	124	108
August	397	348	159	113	113	99
September	554	469	288	108	92	77
October	607	406	244	160	83	66
November	594	322	310	167	100	50
December	489	404	179	103	89	75
1981						
January	585	502	329	117	113	97

[1] Routes 13 and 16 combined, with Route 16 starting September 1979.

[2] Bicycle counts for June 1980 through January 1981 are calculated from monthly total ridership, and are thus generally too low for weekdays and too high for weekends. Passenger counts for the months of June, September, and December 1980 and January 1981 are also derived from monthly totals.

Exhibit 6.7

FLUCTUATIONS IN WEEKDAY VS. WEEKEND RIDERSHIP



1,2,3 PASSENGERS WITHOUT BICYCLES
4,5,6 PASSENGERS WITH BICYCLES

WEEKDAY
SATURDAY
SUNDAY

Exhibit 6.8

BICYCLE STORAGE AT MAJOR RACK LOCATIONS

Location / Month	Santa Barbara Transit Center				Goleta Transit Center				Storke/ Hollister			
	AM[1]	NO	PM	NI	AM	NO	PM	NI	AM	NO	PM	NI
February 1980 (Weekdays)	37		26		1		1		0		0	
March 1980 (Weekends)	14		12		2		1		0		1	
April 1980 (Weekdays)	24	23	20		3	2	6		1	0	0	
May 1980 (Weekdays)	32				5				1			
June 1980 (Weekdays)			26				5				0	
July 1980 (Weekdays)	21				4				0			
August 1980 (Weekends)			29				4				3	
October 1980 (Weekdays)	38	43	38	16	2	7	10	7	4	4	5	4
March 1981	(Weekends)				(Weekdays)				(Weekdays)			
	21	30	25	14	6	6	3	4	1	1	0	0
April 1981	(Weekdays)				(Weekdays)				(Weekends)			
	20	20	20	19	13	10	10	10	1	2	2	1

[1] AM = 7-9 a.m., NO = 9 a.m. - 2 p.m., PM = 2-4 p.m., NI = after 4 p.m. Blanks indicate missing counts.

on the bicycle rack user surveys conducted in November 1979 and May 1980 about one-half of all the respondents expressed concern about the insufficient number of racks provided at bus stops in general; the lack of space at both transit centers was especially noticed.

- At the two most heavily used locations, different developments were observed over the course of the evaluation. The racks at the Goleta Transit Center became increasingly popular, showing their heaviest level of use four months after the end of the demonstration, in April 1981. The counts at the Santa Barbara Transit Center showed a fairly steady level of use with higher patronage during the October 1980 surveillance, and lower use in the April 1981 observations (consistent with overall bicycle-trailer usage).

- Over the course of the day, use of the racks was highest around noon, decreasing in the "p.m." and "night" periods.

- The lockers received little use. Only one bicyclist rented one locker in September 1980, despite promotion of this service from May 1, 1980 onwards. It seems that lockers are mainly of interest for overnight storage and where safety and security problems exist.

6.3.6 New Users Attracted to Transit

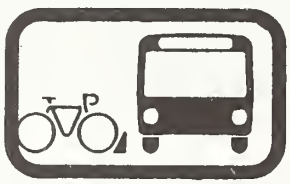
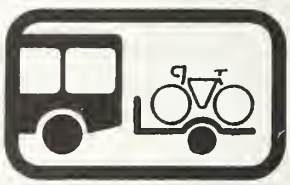
This section evaluates whether new riders were attracted to Santa Barbara transit as a result of the new demonstration services. And if so, how did these passengers previously make these trips? One of the objectives of the demonstration was to reduce the level of automobile travel in Santa Barbara.

Based on the proportionally greater increase of both the general ridership and especially the number of bicycles transported on the bicycle-trailer paratransit routes, it appears clear that the new services attracted additional transit users when compared to the rest of the transit system. However, in order to relate these increases to the bicycle locker and trailer demonstration specifically, only riders who used a bicycle to access the bus service and riders who had a bicycle on the trailer were considered. A question regarding these users' "previous mode of travel" (i.e., before the start of the demonstration) was included in the 1979 and 1980 on-board passenger surveys. A breakdown of the survey responses is shown in Exhibit 6.9.

Those passengers who would not have previously made the trip can be considered new users, and those who made the trip using another mode of travel (except for the users of "other buses") can be considered diverted users. New users represented 11 percent of all passengers in 1979 and 13-14 percent in 1980, with little difference noted between those loading bicycles and those who did not. Diverted users represented 62 percent in 1979 and 70 percent in 1980 of the passengers

Exhibit 6.9

TRAVEL MODES USED BEFORE BICYCLE-TRAILER SERVICES

	ON-BOARD SURVEYS			
	 1		 2	
	1979 (n=70) %	1980 (n=161) %	1979 (n=81) %	1980 (n=146) %
Would not have made trip	11.4	14.3	11.1	13.0
Drove myself	20.0	23.0	19.8	25.3
Auto passenger	7.1	8.1	9.9	6.2
Bicycle	32.9	39.1	30.9	35.6
Other buses	28.6	13.7	27.2	17.1
Walked	0.0	0.0	0.0	0.7
Other	0.0	1.9	1.2	2.1
TOTAL	100.0	100.0	100.0	100.0

1 Passengers who accessed their originating bus stop by bicycle.

2 Passengers who transported their bicycle on the bicycle-trailer during the survey.

with a bicycle on the trailer. The majority of the diverted users are passengers who would have formerly bicycled the entire trip, and to whom the trailer service is a welcome and more convenient travel alternative. A sizeable and an increasing proportion of former car drivers and passengers were attracted to the service (27 percent in 1979 and 31 percent in 1980). Although some of those previous auto users were diverted because of an interest in bicycling and the new bicycle-trailer services, most were likely diverted because of increasing gasoline prices.

6.4 USER AND NON-USER CHARACTERISTICS

The characteristics of users and non-users of the bicycle-trailer and transit demonstration services were analyzed on the basis of the surveys listed in the second section of this chapter. For each characteristic relevant outcomes are discussed for three groups:

1. Transit users. SBMTD transit riders who accessed the bus stop by bicycle on the day of the survey, riders whose major mode of local travel was the bicycle-trailer service, or riders who used the bicycle racks at various bus stops;

2. Special target groups. Employees in downtown Santa Barbara, Santa Barbara students, bicycle path users, and those transit users whose major mode of local travel is the automobile; and

3. General community. Households representative of the SBMTD service area.

6.4.1 Age

The majority of all transit users are young adults in the age group "19 to 34 years" as shown in the top portion of Exhibit 6.10. Not surprising, this is especially true for bicycle-accessed passengers, where about 60-75% belonged to this age group. Conversely, very few elderly persons used the paratransit services, and practically none used the bicycle-trailer and bicycle rack facilities.

In both the special target groups and the general community, older groups are more strongly represented, with about 63% of all employees over 34 years of age and almost 20% of the general population 60 years or older. Respondents under the age of 16 represented 12% of the transit users in 1980. Although this share cannot be compared to their share in the general service area because the household survey addressed adults only, young and old people are typically two of the major groups dependent on public transit services. The discrepancy in the level of

Exhibit 6.10

USER AND NON-USER CHARACTERISTICS: AGE

Transit Users	On-Board Surveys All 1978 (n=10503)	All 1979 (n=692)	All 1980 (n=838)	BA 1978 (n=158)	BA 1979 (n=82)	BA 1980 (n=202)	MMT 1980 (n=136)	Bike Rack Users 1979 (n=18)	1980 (n=19)
15 or under	17.0	7.7	12.2	9.5	4.9	11.4	13.2	5.6	5.2
16 to 18	13.9	15.9	13.1	5.7	11.0	8.4	14.7	0.0	5.2
19 to 24	30.2	37.0	39.5	61.4	40.2	49.5	40.4	55.6	10.6
25 to 34	16.1	24.9	22.7	17.1	35.4	24.8	20.6	27.8	63.2
35 to 59	10.9	11.1	9.4	3.2	8.5	5.4	9.6	11.1	15.8
60 or over	11.8	3.9	3.1	3.2	0.0	0.5	1.5	0.0	0.0

Target Groups and Community	Employees 1980 (n=179)	Bike Path Users 1979 (n=252)	On-Board Survey MMA 1980 (n=113)	Household 1980 (n=562)
15 or under	0.0	18.7	1.8	8.4
16 to 18			15.0	
19 to 24	10.1	32.5	35.4	21.9
25 to 34	26.8		29.2	27.3
35 to 59	55.9	44.8	15.9	23.2
60 or over	7.3	4.0	2.7	19.2

Legend:

BA = Passengers with access mode "bicycle"

MMT = Passengers with main travel mode "bicycle-trailer"

MMA = Passengers with main travel mode "automobile"

elderly use of these transit services can probably be attributed to the physical requirements of bicycling.

6.4.2 Sex

Among transit users, male respondents are slightly over-represented in the transit and bicycle use groups. As shown in the top portion of Exhibit 6.11, 61% of all bicycle-accessed respondents and 67% of all bike rack users in the 1980 on-board and bike rack surveys were men. In the special target groups, 62% of the bike path users were male although 63% of the male respondents in 1980 indicated their main mode of transportation was the automobile. Women, however, are slightly over-represented in some of the target groups, with 52% of the students and 62% of the downtown employees being female. The household survey showed a fairly equal distribution in the population of the service area. Overall, more men than women used the coordinated bicycle-trailer and paratransit services and the bicycle racks.

6.4.3 Occupation

Corresponding to the predominant age group of transit users (19 to 34 years), about 60% of transit and/or bicycle-facility users are students, and about 30% are employed (see Exhibit 6.12). A comparison of students among transit users to their share in the general service area population (60% versus 23%) reflects their attraction to this special service. Yet even this area-wide percentage shows how strongly Santa Barbara as a community is influenced by the presence of its colleges. In fact, SBMTD planned the bicycle-trailer routes to facilitate use by the University of California and Westmont College students in particular.

6.4.4 Bicycle and Car Ownership and Availability

The top portion of Exhibit 6.13 shows the bicycle ownership results from the various Santa Barbara surveys. In Santa Barbara, bicycle ownership is more common among transit users than in the population in general (about 74% compared to 67%). Employees owned significantly fewer bicycles, with only half reporting that at least one bicycle was available for them to use. In comparison, an estimated 43% of the inhabitants in the U.S. owned a bicycle in the mid-70's.[5] Santa

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[5] Mayo, Marda Fortmann, Bicycling and Air Quality Information Document, U.S. Department of Transportation and Environmental Protection Agency,

Exhibit 6.11

USER AND NON-USER CHARACTERISTICS: SEX

Transit Users	On-Board Surveys					Bike Rack Users	
	All 1979 (n=666)	All 1980 (n=794)	BA 1979 (n=77)	BA 1980 (n=188)	MMT 1980 (n=128)	1979 (n=17)	1980 (n=18)
Female	53.5	49.0	48.1	39.4	40.6	41.2	33.3
Male	46.5	51.0	51.9	60.6	59.4	58.8	66.7

Target Groups and Community	All Students 1979 (n=482)	Employees 1980 (n=183)	Bike Path Users 1979 (n=225)	On-Board Survey MMA 1980 (n=105)	Household 1980 (n=577)
Female	52.1	61.7	38.2	37.1	49.6
Male	47.9	38.3	61.8	62.9	50.4

Legend: BA = Passengers with access mode "bicycle"
MMT = Passengers with main travel mode "bicycle-trailer"
MMA = Passengers with main travel mode "automobile"

Exhibit 6.12

USER AND NON-USER CHARACTERISTICS: OCCUPATION

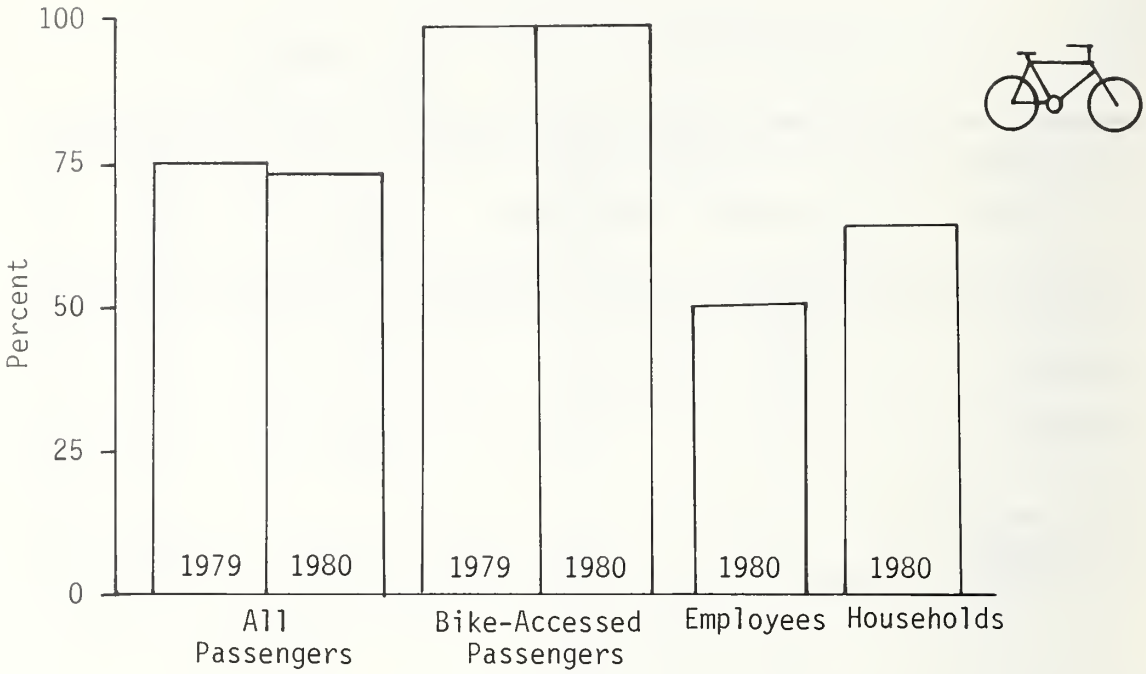
Transit Users	On-Board Survey		Bike Rack Users	
	All 1980 (n=840)	MMT 1980 (n=137)	1979 (n=18)	1980 (n=18)
Student	60.5	62.8	55.6	77.8
Employed	31.2	30.7	38.9	22.2
Homemaker	3.1	2.2	5.6	0.0
Retired	2.4	0.7	0.0	0.0
Not currently employed	2.9	3.6	0.0	0.0

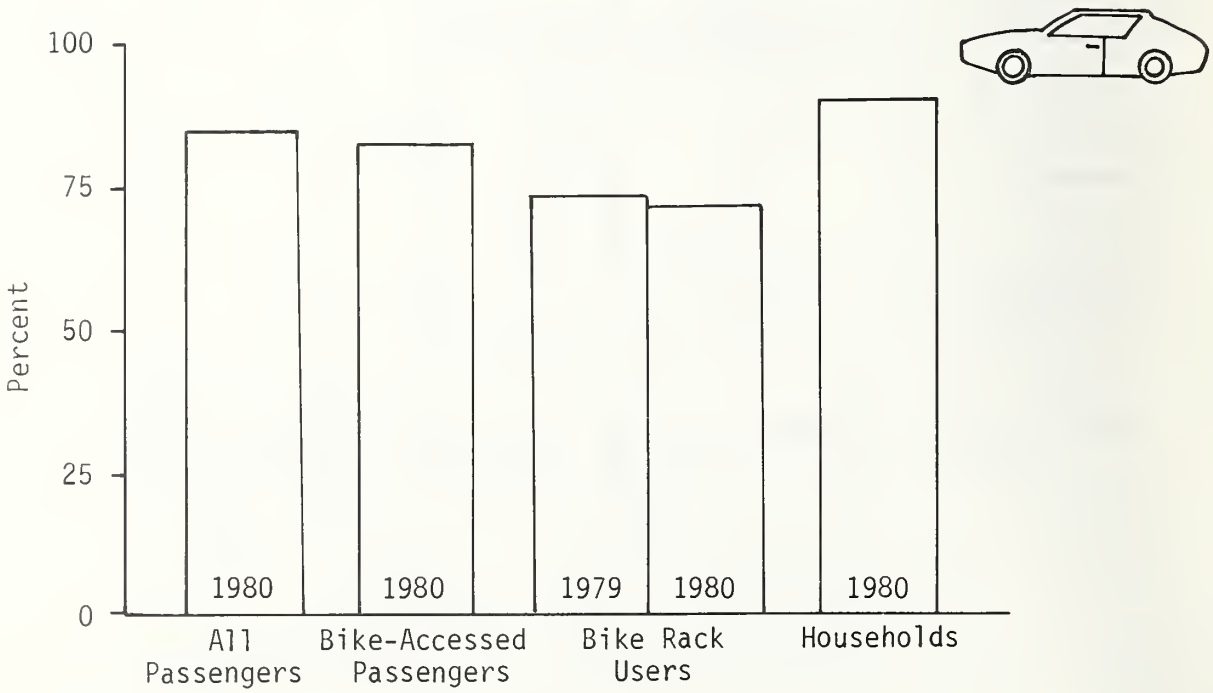
Target Groups and Community	On-Board Survey MMA 1980 (n=116)	Household 1980 (n=569)
Student	45.7	22.5
Employed	43.1	53.3
Homemaker	4.3	6.3
Retired	1.7	16.2
Not currently employed	5.2	1.8

Legend: MMT = Passengers with main travel mode "bicycle-trailer"
MMA = Passengers with main travel mode "automobile"

Exhibit 6.13

BICYCLE AND CAR OWNERSHIP
FOR VARIOUS SURVEYED GROUPS





Barbara's relatively high rate of bicycle ownership makes it an ideal community for coordinating bicycles and transit services.

Most respondents also had access to a car owned or operated by their household. Bicycle-using transit patrons owned fewer cars (about 70-75%) than general transit users (80-85%) and the general population (over 90%), as shown in the bottom portion of Exhibit 6.13. Households in general also had a larger share of respondents with a driver's license and had more cars readily available than transit users. Similar to conventional transit users, coordinated bicycle and transit users own or have access to fewer automobiles, making them more dependent on alternative modes of transportation. However, one-fourth to one-third of the bicycle-accessed transit users had a car available for their trip, but preferred to use the coordinated bicycle and transit mode. The detailed results from these surveys are shown in Appendix B.

6.5 TRIP CHARACTERISTICS

6.5.1 Access Mode and Time

The number of transit users who accessed bicycle-trailer bus stops by bicycle increased significantly over time, rising from 1.5% in 1978 to 12% in 1979 and 23% in 1980. Over the same 3-year period, walk access transit users decreased from 80% to 63% to 54%, respectively. The other modes' shares remained relatively constant. (Compare Exhibit 6.14).

This shift from walk to bicycle also resulted in increased average access times (5.5 minutes in 1978, 7.7 minutes in 1979, and 9.9 minutes in 1980). Bike rack use also followed this trend. Thus, patrons seem willing to travel much longer distances to a bus stop, because it is faster and more convenient to do so by bicycle than on foot. This expands bicycle users' accessibility of transit services, thereby increasing SBMTD's service area coverage.

6.5.2 Trip Purpose

The major trip purposes for all groups were school and work (compare Exhibit 6.15), with a total share of 60-70% in most cases. Work trips had slightly larger shares compared to school trips among bicycle-accessed passengers, and among those whose main mode of local travel was the bicycle-trailer service. Although earlier results indicated the majority of bicycle transit users were students, the high proportion of work trips may be explained by the fact that many students are also employed.

Washington, D.C., September 1979, p. 9.

Exhibit 6.14

TRIP CHARACTERISTICS: ACCESS MODE AND TIME

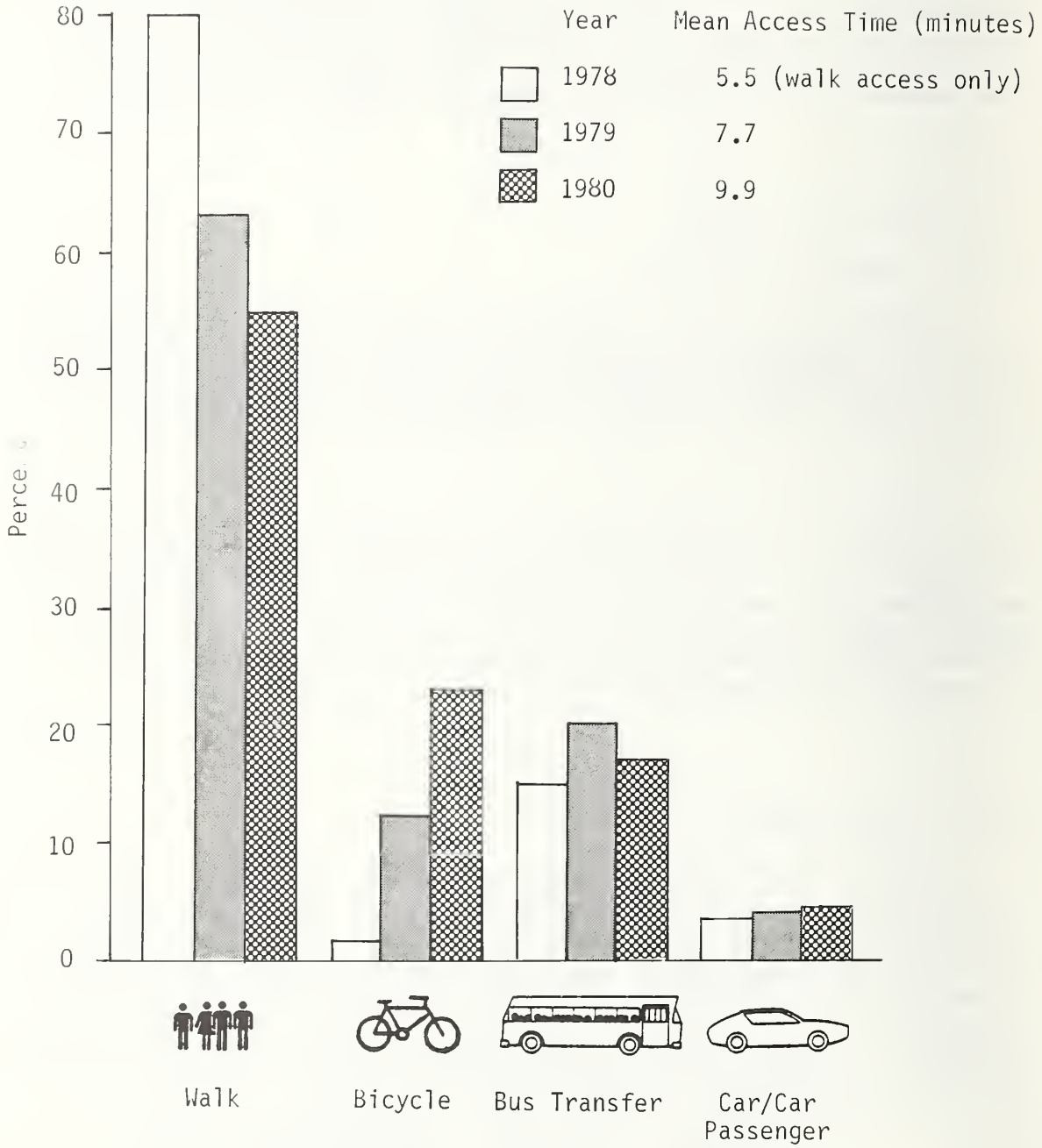
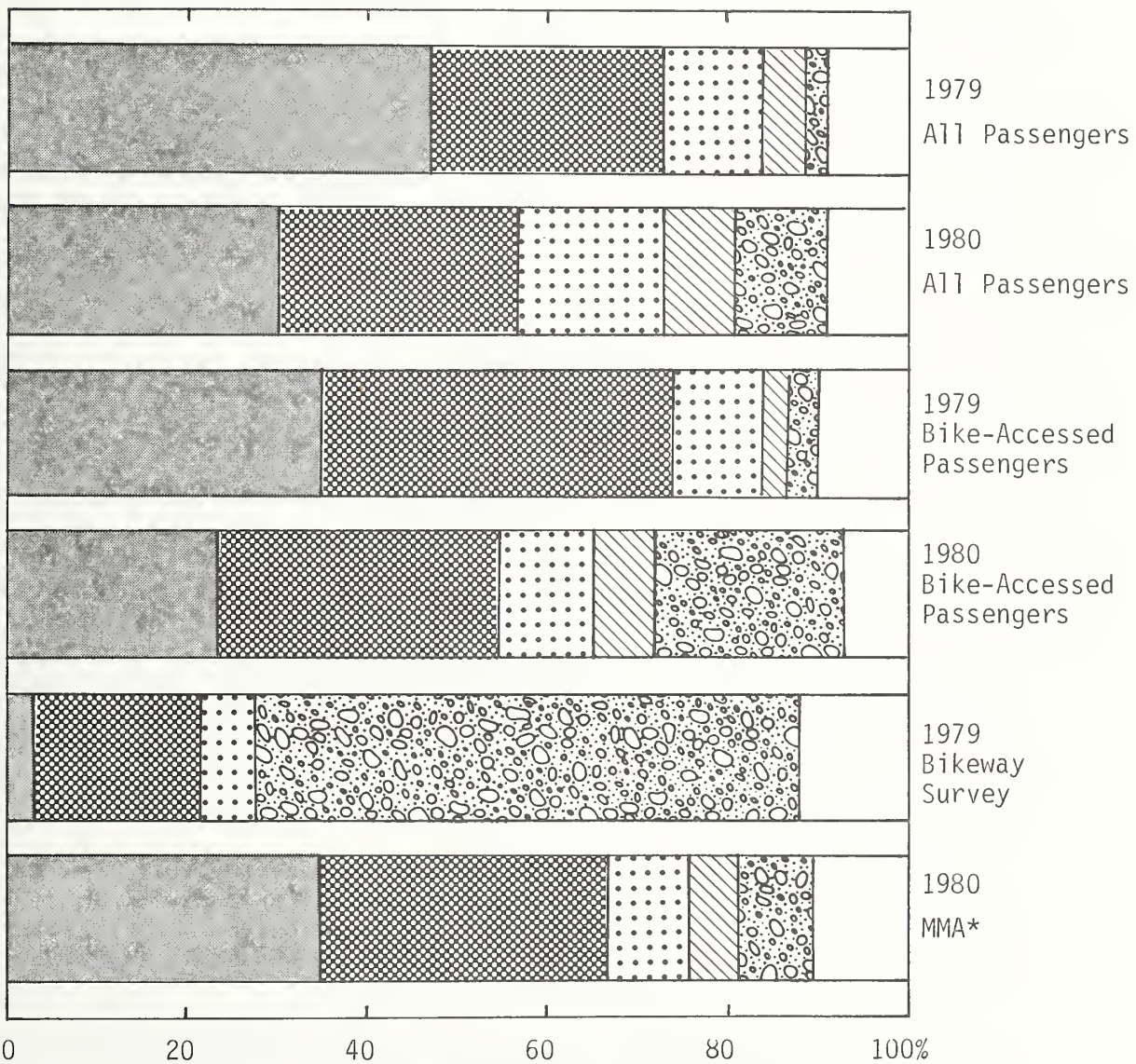


Exhibit 6.15

TRIP CHARACTERISTICS: TRIP PURPOSE



*MMA = Passengers with main travel mode "automobile"

Overall transit trip making has extended considerably beyond school and commute travel, and between 1978 and 1980 travel for shopping, social and recreational purposes increased from 17% to 35%. The bicycle-transit service attracted proportionally more work and recreational trips than conventional transit, which is shown by the higher shares of these purposes among bike-accessed passengers.

6.5.3 Major Mode of Local Travel

The use of buses as a major mode of local travel declined from 1979 to 1980 among transit users in general. It declined to 45% from an original level of 54%. Most of this loss seems due to increased preferences for bicycling and walking. Among bicycle-accessed passengers, however, the decrease was due to a switch to "car" and "car passenger" modes.

For Santa Barbara students, "car" and "car passenger" are jointly more popular modes than bicycle (43% compared to 33%). Not surprisingly, employees and households also show the greatest preference for car travel. The change in transit and automobile use from 1979 to 1980 may partly be due to the easing of gasoline shortages and prices. Detailed survey results are contained in Appendix B.

6.5.4 Frequency of Use of Various Travel Modes

Bicycle-accessed transit riders who used the bus at least once a week declined from 80% to about 65% from 1979 to 1980. Surprisingly, over 60% of the riders whose main mode of travel was by automobile also ride the bus at least once a week. In other groups, bus use was less frequent: about 33% of the students and 39% of all household members ride a bus at least once a week.

A similar decline occurred in the frequency of bicycle-trailer use. About 68% of all transit users used bicycle-trailer buses at least once a week in 1980, down from 77% in 1979. And a considerably larger number of students and employees used bikes instead of buses for their most frequent mode of travel.

These results are compatible with the decreased use of buses as a major mode of local travel. On the other hand, general ridership showed a steady increase, especially on bicycle-trailer routes. A possible explanation is that a larger number of people are now using transit and bicycle-trailer services, but each user is riding less frequently than before. Coupling this finding with the large number of bus users and residents who have bicycles and automobiles available to them, indicates the wide variety and use of alternative travel modes in the Santa Barbara area.

6.5.5 Use of Bike-Bus Services

Exhibit 6.16 presents figures on the use of the new combined bicycle-bus services by special target groups and the general community. The new bicycle-trailer services were most commonly used by students. Students also comprised the highest share of respondents who accessed a bus stop by bicycle. Most of the students who used the trailer to transport their bicycle, did so shortly before they were surveyed. This is probably because a new school term had recently begun (Fall of 1979) and there is a high rate of student turnover each year.

About 90% of the employees and the general community had not used the coordinated bike rack or bike trailer and transit services. They form a large target group that might be attracted to coordinated bike and transit services in the future. These data may be useful for other communities in assessing how many potential or actual users and what type of users could be attracted to this type of service.

6.6 USER AND NON-USER ATTITUDES

6.6.1 Reasons for Use of Bike-Bus

The various surveys asked respondents why they preferred alternative local travel modes. Of all passengers surveyed in 1980, 24% reportedly had an automobile conveniently available to them, but about half of them (52%) did not use it because of high gasoline prices. Expensive gasoline is the main reason why all the other groups of transit users preferred the bike-bus alternative. Convenience is the second most important reason why bike-bus users prefer this service. Related to the price of gasoline is the importance of the energy-efficiency of the bicycle-trailer service, another frequently cited reason. The ability to take a bicycle along on the trip seems less important to most users of the service. These attitudes may explain why a considerable number (between 17% and 47%) of transit users could make trips by car, but preferred to use transit.

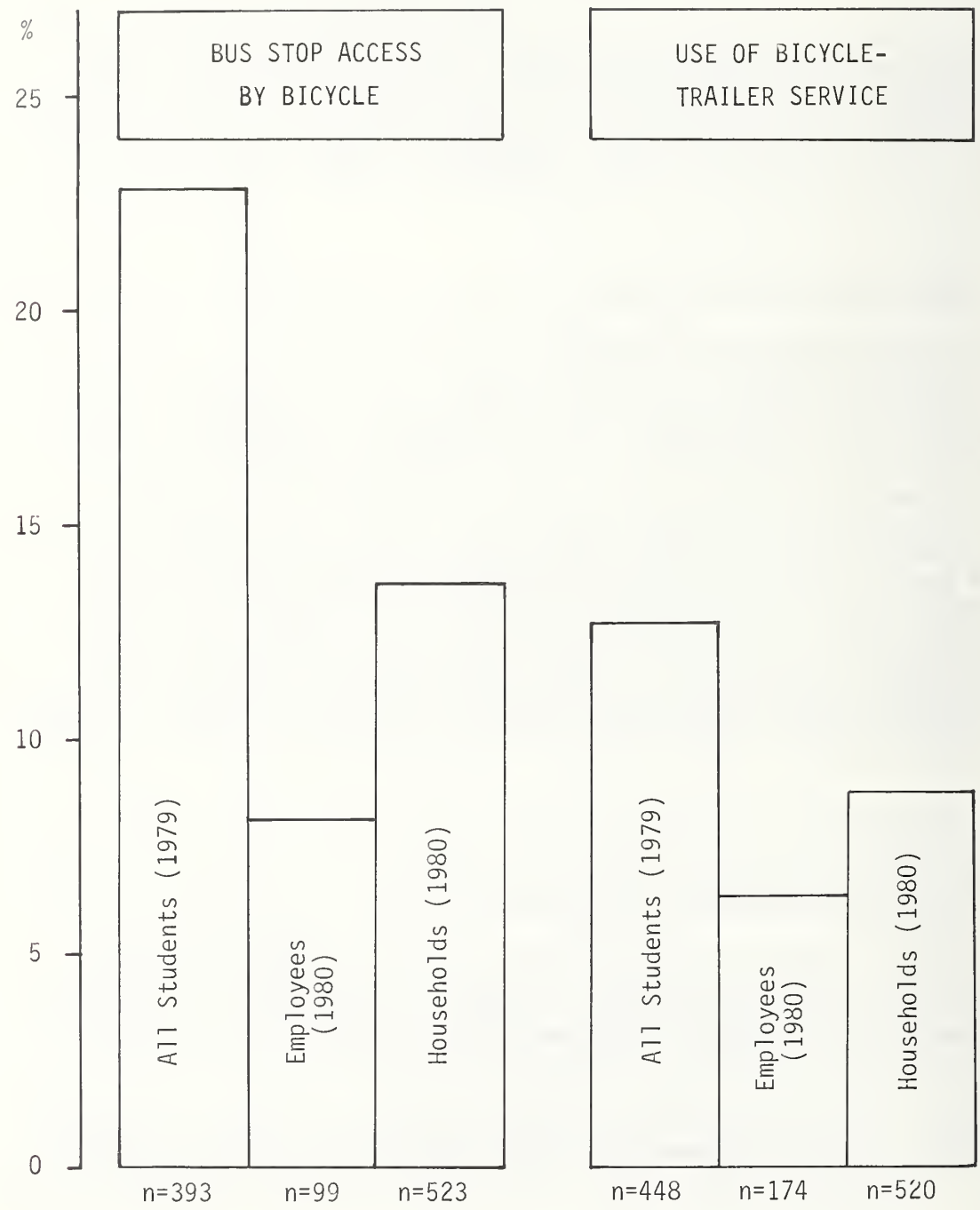
6.6.2 Community Awareness of Bike-Bus Services

Although relatively few residents of the SBMTD service area used the bike-bus service, most residents knew of its existence. Surveys indicated 87% to 97% of students, employees, and service area households were aware of the bicycle-trailer service. The major source of this information was different from group to group:

- Among transit users, about half saw the bicycle-trailer operating, and one-fifth each were told by friends or knew from their previous use of Route 13 (i.e., before the start of the demonstration);

Exhibit 6.16

TRIP CHARACTERISTICS: USE OF BIKE-BUS SERVICES



- Among students, employees, and households, direct observations of the operating bicycle-trailer were the primary source of information, with some employees and households hearing the radio advertisements.

Judging by these results, advertisements in newspapers, brochures, and bicycle shops do not appear to have been effective.

6.6.3 User Ratings of Bike-Bus Services

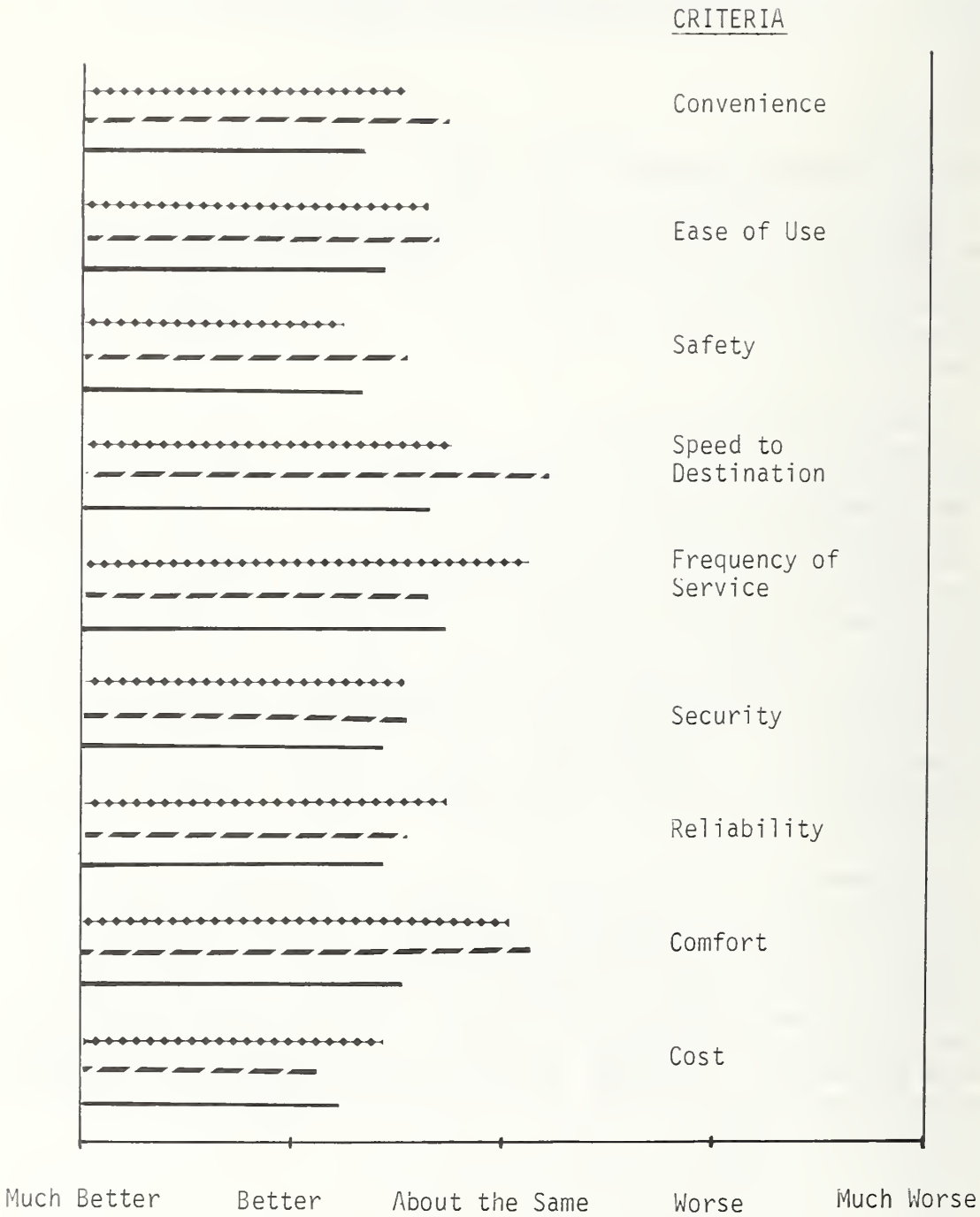
Users of the bicycle-trailer service were asked to compare this service with their major travel mode. Users of the bicycle racks at bus stops were also asked to rate these services. The mean results of these judgments are indicated in Exhibit 6.17. A value of 3 represents a neutral opinion; a lower value reflects a more positive attitude, and a higher value reflects a more negative opinion.

Examining attitudes toward the bicycle-trailer first, it appears that an average rating worse than 3 was given in two cases only: 1) by UCSB students regarding the "frequency of service" and 2) by Westmont students regarding the "speed to destination". This can be interpreted as 1) unsatisfied demand for bicycle-trailer service on Route 13 and as 2) demand for express service on Route 16, similar to Route 13. All other ratings are between 2 and 3, indicating that respondents feel bicycle-trailer services are slightly better than their major mode of local travel. Among the criteria, "cost" received the most favorable judgments, followed by "safety" and "convenience". Respondents gave the worst ratings to "frequency of service" and "speed to destination" -- areas in which a private automobile is clearly superior to public transit in general. Overall, the on-board survey respondents felt services were better than did the students, and the 1979 on-board survey respondents felt services were the best.

Attitudes toward the bicycle racks show a remarkable improvement from 1979 to 1980. In both years, the "convenience of the rack's location" was rated as "good" to "excellent". The lower rating for "security" corresponds with complaints bicyclists forwarded in the bike rack user surveys -- some bicycles were vandalized while they were locked to a bike rack (e.g., slit tires). The large improvement in the "ease of use" and "reliability" of the bike racks between 1979 and 1980 may be due to the respondents' continued use and better understanding of the facilities.

Exhibit 6.17

RATINGS OF THE BICYCLE-TRAILER SERVICES VS. MAJOR TRAVEL MODE



7. ECONOMICS AND EFFICIENCY

7.1 OVERVIEW

The economics and efficiency of coordinating bicycles and transit services can be determined by identifying the costs associated with this demonstration project. In Santa Barbara bicycle-trailers were only operated on routes served by mini-buses. An analysis of the costs of the demonstration services must therefore consider:

- the costs of operating mini-buses compared to conventional size buses;
- the costs of constructing and operating the six bicycle-trailers;
- the costs of purchasing and installing the bicycle racks and lockers; and
- the costs of marketing the new services.

7.2 ECONOMICS OF OPERATING CONVENTIONAL BUSES AND MINIBUSES

7.2.1 Fleet Characteristics

The SBMTD did not purchase any additional minibuses for the demonstration. In 1980, the SBMTD had a fleet of 42 conventional-size coaches and 19 minibuses, of which they assigned 36 and 12, respectively, to peak service hours. The conventional-size vehicles are General Motors coaches, which seat 45 passengers. The smaller vehicles are Mercedes minibuses, which seat 19 passengers.

7.2.2 Overall Costs

The following table compares the average operating and maintenance costs for these vehicles in 1979:

	Conventional Size Buses	All Minibuses
Miles/gallon of fuel	4.47	11.68
Miles/quart of oil	212.50	195.60
Total monthly vehicle-miles	139,619	41,860
Average costs/mile		
- Fuel	$.0864	$.0339
- Oil	$.0020	$.0022
- Labor	$.0362	$.0406
- Parts	$.0498	$.0420
Total	$.1744	$.1187

Overall, the minibuses cost 32% less to operate per vehicle-mile than the conventional size buses. The major difference in the average cost per vehicle-mile is due to the minibuses better fuel economy. The other cost figures are not substantially different for each type of vehicle.

7.2.3 Operating Efficiencies

To determine the relative efficiencies of these two vehicle types their supply and demand characteristics can be compared to their overall operating costs. Exhibit 7.1 details the costs and efficiencies of operating 1) Route 13, the major minibus and bicycle-trailer route; 2) all SBMTD minibus routes (which includes both bicycle-trailer and regular minibus routes); and 3) all other routes in the SBMTD system. The data are presented separately for weekdays and Saturdays in May 1980 and for the entire month of January 1981.

All minibus routes, and especially Route 13, are markedly superior to the other SBMTD routes in terms of cost per vehicle-mile. This cost advantage is mainly due to the degree of express routing of these vehicles. In 1980, all minibus routes had higher average costs per hour and Route 13 had the highest average hourly costs. But, by 1981 all routes showed similar performance in the cost per vehicle-hour category. This change may be associated with reductions in bicycle-trailer loading and unloading time requirements, as SBMTD implemented more limited stop service and bicyclists became more familiar with the equipment.

Routes with conventional-size buses were clearly superior to routes with minibuses when calculated on the basis of the number of passengers. This is explained primarily by the fact that regular size vehicles can carry more than twice as many passengers as minibuses. In Santa Barbara, the conventional-size buses have 58% more seating capacity than minibuses. But, the average cost per passenger ranged from 58% to 69%

Exhibit 7.1

COSTS AND PRODUCTIVITY OF

CONVENTIONAL BUS AND MINIBUS SERVICE

	Revenue Miles	Revenue Hours	Passengers	Cost/ Mile	Cost/ Hour	Cost/ Pass.	Pass./ Mile
May 1980							
Weekdays							
Route 13	18,501	725	15,225	$1.42	$36.24	$1.73	0.82
Minibus Routes	41,580	2,292	53,361	1.70	30.88	1.33	1.28
Other Routes	140,276	9,148	494,970	1.88	28.84	0.53	3.53
Saturdays							
Route 13	3,140	126	2,625	1.44	35.80	1.72	0.84
Minibus Routes	7,790	469.5	6,510	1.79	29.76	2.15	0.84
Other Routes	16,140	1,059	44,080	1.89	28.78	0.69	2.73
January 1981							
Route 13	22,241.5	978.6	14,593	1.37	31.19	2.09	0.66
Minibus Routes	49,879.5	2,897.4	56,734	1.80	31.00	1.58	1.14
Other Routes	162,597.5	11,373.5	527,178	2.17	31.04	0.67	3.24

1980: Routes 9, 13, 16, 22, 23; 1981: Routes 9, 13, 16, 22, 23, 26, 27.

higher and the number of passengers per mile ranged from 64% to 80% lower for minibus service (including Route 13) as compared to conventional bus service.

On the other hand, SBMTD deployed minibuses on routes where passenger demand did not warrant service by full-size buses. By coordinating minibus routes with bicycle-trailers SBMTD was also successful in attracting additional riders to transit. This strategy thus lowered the overall cost per passenger of operating these otherwise inefficient routes.

7.3 BICYCLE-TRAILER COSTS

7.3.1 Capital Costs

To develop the bicycle-trailer used for the demonstration, the SBMTD went through three generations of bicycle-trailers. The University of San Diego built and donated the first trailer. SBMTD developed and built the second trailer at a cost of $3,000. The design of the third-generation trailer included several improvements on the second trailer model (see Sections 3.1 and 3.2 for specific trailer modifications).

A third-generation prototype trailer was initially built at a cost of about $4,300. SBMTD then contracted with a local welding shop to build five more units for $3,740 each, for a total trailer demonstration cost of about $23,000. The first trailer had an operating life of one year; no conclusive data are yet available on the expected operating life of the current trailers.

The SBMTD also equipped 15 of their 19 minibuses with hitches to pull the bicycle-trailers at a total capital cost of $1,453.

7.3.2 Operating Costs

SBMTD operated a fleet of six bicycle-trailers during the demonstration. The cost of operating these services includes four major components: maintenance, cleaning, additional running time, and insurance.

Maintenance

Maintenance costs include both regularly scheduled maintenance and special items. The items which required major or frequent maintenance included: replacing the bicycle tie-down straps; replacing the tires on the trailers; replacing the leaf spring part of the suspension; adjusting the wheel bearings and repairing the hitch on the trailer.

The special maintenance items resulted from accidents and included: replacing trailer tail lights and additional repairs to the hitch on the trailer.

Average annual maintenance costs for these regularly recurring items are tabulated in Exhibit 7.2. The special repairs resulted in negligible maintenance expenses. Overall, maintenance costs are fairly evenly divided between labor and parts. The total annual fleet cost of $3,039 corresponds to an average of $.0082 per vehicle-mile of bicycle-trailer service.

Cleaning

Four of the six trailers were in regular use, with two trailers available for back-up service. The SBMTD cleaned an average of four trailers by hand, once a week. This process required a total of 2 hours of labor per week, at $11 per hour for a total cost of about $1,144 annually. Trailer cleaning and maintenance costs are presented in Exhibit 7.2.

Additional Running Time

Bus drivers on the bicycle-trailer routes estimated that bicycle loading and unloading time added about 5 minutes per hour to their route running times. An annual analysis of bicycle riders' loading and unloading requirements suggests the time needed may be shorter. If layover times between route runs can accomodate or partially offset this increase in route running time, then no charge or only minor increases in costs should result.

Assuming the worst case, a four percent increase in running time multiplied by SBMTD's average operating cost of $31.00 per vehicle-hour is equal to trailer-induced operating costs of $1.24 per vehicle-hour. The SBMTD operated about 15,600 bicycle-trailer vehicle hours in 1980-81, for a maximum additional running time cost of almost $19,300 per year.

Insurance

The SBMTD paid $.05492 per operating mile to insure each trailer, which is the same rate they paid for each mile of minibus operation. Exhibit 7.3 lists the marginal costs attributed to the bicycle-trailers and presents the additional operating cost per passenger both including and excluding the cost of insurance. A significant portion of the total costs resulted from the insurance premiums.

This appears to be an unjustifiably high cost since during the two-year demonstration, relatively few bicycle-trailer accidents, bicycle rack accidents, bicycle damages and personal injuries occurred. All of these were minor incidents and the SBMTD incurred a total cost of less than $200 ($83 for bicycle-trailer accidents, $107 for bicycle damages and no claims were filed for bicycle rack accidents or for personal injuries). Considering that this was an experimental project

Exhibit 7.2

BICYCLE-TRAILER MAINTENANCE AND CLEANING COSTS

Major or frequent items	Average frequency of service	Parts costs ($)	Labor (minutes)	Average total fleet costs Labor ($)	Parts ($)	Total ($)
Replace bicycle tie-down straps	10/wk.	$ 0.89	8	$760	$463	$1,223
Replace tire	2/mo.	35.00	15	66	840	906
Replace leaf spring	6/yr.	30.00	60	66	180	246
Adjust wheel bearing	1/wk.	-	30	286	-	286
Repair trailer hitch	1/mo.	15.00	90	198	180	378
Total average maintenance				$1,376	$1,663	$3,039
Cleaning by hand	4/wk.	-	30	1,144	-	1,144
Total regular maintenance and cleaning costs				$2,520	$1,663	$4,183

Based on maintenance records and estimates from SBMTD mechanics for a fleet of six bicycle-trailers. An average labor cost of $11.00/hr. has been used.

and the low number of liability claims related to the bicycle-trailers, the insurance costs are expected to be lower in the future.

7.4 RACKS AND LOCKERS

The SBMTD purchased 82 single-unit Rally bicycle racks for about $24 per rack for a total cost of $1,935. They also purchased 69 double-unit bicycle racks for about $25 per unit ($50 per rack) for a total cost of $3,489. The SBMTD installed these racks throughout the District for $480. Overall, the capital and installation costs for the bicycle racks totalled about $6,000.

The SBMTD also installed 24 Sunshine bicycle lockers at the Goleta Transit Center. Each bicycle locker cost about $275 for a total purchase price of $6,636. An additional $470 was spent for installation. No rack or locker maintenance costs were identified.

7.5 MARKETING

SBMTD conducted three major marketing campaigns to introduce the Bus 'n Bike and Bike 'n Ride services to the public. The introductory campaign had a total cost of about $1,700. The second effort was more extensive and involved advertisements in newspapers ($9,500), radio ($14,000), and on buses, bus cards, and bus stop signs ($7,500). The third campaign was a film shown on the public broadcasting television and cost an estimated $18,000. The overall marketing costs of the two-year coordinated bicycle and transit demonstration was about $50,000.

7.6 SUMMARY

The economics and efficiencies of providing coordinated bicycle and transit services are examined from four viewpoints: 1) minibus versus conventional-size bus operation; 2) bicycle-trailer construction and operation; 3) bicycle rack and locker purchase and installation; and 4) marketing costs. In summary, the bicycle-trailer minibus routes cost less to operate per vehicle-mile than conventional buses due primarily to vehicle fuel efficiencies and express routing. Conventional buses, however, had much higher productivities on a per-passenger basis. Overall, minibuses and conventional buses had fairly comparable costs.

The total capital costs for 6 bicycle-trailers and 15 trailer hitches was about $25,000. The SBMTD spent $12,000 to purchase and $1,000 to install the bicycle racks and lockers. Trailer maintenance and cleaning cost about $4,000 per year and increases in bicycle-trailer

Exhibit 7.3

OPERATING COST OF BICYCLE-TRAILER SERVICE

Route	Vehicle-Miles	Vehicle-Hours	Passengers with bicycles	Operating Costs ($) Maintenance/Running Time/Insurance			Cost/Passenger ($) Without Insurance	Total
12	28,080	1,300	1,560	317	1,612	1,542	1.24	2.23
13	125,763	4,859	12,200	1,422	6,025	6,907	0.61	1.18
16	74,363	3,250	4,524	841	4,030	4,084	1.08	1.98
26	104,698	4,563	20,065	1,184	5,658	5,750	0.34	0.63
27	36,976	1,590	3,741	419	1,972	2,030	0.64	1.18
Total	369,880	15,562	42,090	4,183	19,297	20,313	0.56	1.04

Estimates for Route 12 are based on data for October-November 1980. All other data supplied by SBMTD. An average operating cost of $31.00/hr. has been used.

vehicle running time added up to an estimated $19,300. Insurance added $20,000 annually. Total annual operating costs for these services are thus estimated to be a maximum of $44,000. Demonstration marketing expenses totalled $50,000, for a total demonstration cost of about $114,000. Exhibit 7.4 itemizes each of these costs.

Exhibit 7.4

BICYCLE TRAILER PROJECT COSTS

Capital Costs		
Trailers (6)	$23,000	
Hitches (15)	$ 1,453	
Racks (82)	$ 1,935	
(69)	$ 3,489	
Lockers (24)	$ 6,635	
Subtotal		$36,513
Installation		
Racks	$ 480	
Lockers	$ 470	
Subtotal		$ 950
perating Costs (annual basis)		
Maintenance	$ 3,039	
Cleaning	$ 1,144	
Maximum ditional Running Time	($19,297)	
Insurance	$20,313	
Subtotal		$43,793
Marketing	$50,000	$50,000
TOTAL COSTS (depending on additional running time costs)		$111,959 - $131,256

8. SUMMARY AND CONCLUSIONS

8.1 OVERVIEW

One of the major objectives of the Santa Barbara Metropolitan Transit District and the U.S. Department of Transportation in testing the integration of bicycle and transit service was to verify the feasibility and effectiveness of these services on a national scale.[1] Demonstration projects do not necessarily succeed or fail because of the success or failure of the innovations or services initially tested. Rather, they succeed if they generate information and experience that is useful to the host community and to other jurisdictions.

Other local transit operators, planners, users and decision makers, who may be interested in coordinating bicycle and transit service will want to learn of Santa Barbara's experiences. The Santa Barbara evaluation can be particularly helpful in understanding the issues and impacts of the design, implementation, level of service, travel behavior and costs of integrating these services. This final chapter outlines some of the major findings in the Santa Barbara demonstration project, highlights some other U.S. cities that have successfully integrated bicycles and transit services and estimates the potential applicability of integrating these services in other areas.

8.2 MAJOR DEMONSTRATION FINDINGS

This section summarizes the demonstration findings under the following categories:

Design, Implementation, and Marketing;
Level of Service;
Travel Behavior; and
Economics and Efficiency.

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[1] Gleason and Allen, "Bicycle Paratransit Demonstration: Final Report", SBMTD, 1981, p.2.

8.2.1 Design, Implementation, and Marketing

Design and Implementation

> Previous experience may minimize service planning and implementation problems.

Before this demonstration, another Southern California city had briefly tested bicycle-trailer and bus services, the Santa Barbara MTD had experimented with two earlier versions of bicycle-trailer and transit service, and the City, the County and the University of Santa Barbara had been active in installing bicycle paths and racks in the community. These experiences provided insights for the SBMTD to develop criteria for the design of the bicycle-trailers, the bicycle racks and lockers, the trailer routes and the bicycle storage sites. No severe design or implementation problems arose and after the demonstration facilities and services were installed only minor changes were necessary. Most of these changes were to meet the increasing demands for service. Thus, it seems that the SBMTD's knowledge and understanding of previous design and operating issues may have been helpful in averting or at least minimizing their problems.

Marketing

> Marketing included planned campaigns as well as on-street bus-trailer operations.

The SBMTD conducted some initial market research to assess the potential of bicycle-trailer services and bicycle storage facilities in Santa Barbara and to identify marketing and advertising strategies. Before the demonstration, surveys indicated there was a large population interested in bicycling but a substantial degree of the public did not know about the existing bike and bus services. An introductory marketing campaign was later followed by a "Bus 'n Bike" and "Bike 'n Ride" advertising blitz and by a brief TV film. Surveys conducted near the end of the demonstration found that about 90% of the public were aware of the service, although most people learned of the service from seeing it operating on the streets. The planned marketing campaigns were not as effective.

8.2.2 Level of Service

Transit Coverage

> Coordinating bicycles and transit services increased the number of patrons accessing transit by bike and increased overall transit coverage.

On-board paratransit surveys showed the number of passengers who accessed the paratransit services by bicycle increased from 1.5% in 1978 to 12% in 1979 and 23% in 1980, while walk access patrons decreased from 80% to 63% to 54%, respectively. This shift from walk to bicycle also resulted in increased average access times (5.5 minutes in 1978, 7.7 minutes in 1979 and 9.9 minutes in 1980). Surveys also indicated bicyclists spent about twice as long as non-bicyclists traveling to bicycle-trailer transit stops.

Since bicyclists can travel much faster than pedestrians, it appears that bicyclists are willing to spend some additional time to travel significantly longer distances. "Bicycle to transit" patrons spent an average of about twice as much time to bike almost eight times farther than "walk to transit" patrons. The demonstration services, thus, significantly increased the coverage of existing transit services to bicycle-users.

Bicycle Trailer Loading and Unloading

> Bicycle-trailer loading required twice as much time as unloading and caused an overall estimated four percent increase in running time.

To load a bicycle onto the trailer took an average of 23 seconds and to unload a bicycle took about 11 seconds. This was because bicyclists often had difficulty fitting the bicycle into the tie-down trailer racks. The SBMTD bus drivers estimated that this could add up to 5 minutes to each hour of vehicle running time, whereas an increase of 1 minute per passenger seems to be a more reasonable assumption.

Trailer Maintenance

> The bicycle-trailers provided reliable service with regular maintenance.

The pre-demonstration trailer services were unreliable due to continual maintenance problems with the two earlier trailers. To avoid similar difficulties, the SBMTD constructed six metal bicycle-trailers for the demonstration, allowing two to be used for back-up service. After the SBMTD resolved initial incompatibilities in the wiring, only about 14 hours of labor per month was required for routine trailer maintenance.

Safety and Security

> The demonstration bicycle-trailers, bicycle racks and lockers were generally safe and secure.

During the 2-year demonstration, a total of 40 incidents were reported. SBMTD incurred a total cost of less than $200 for all accidents, damages and injuries. Most incidents involved minor bicycle damages and no personal injury claims were filed.

8.2.3 Travel Behavior

Paratransit Service

> During the demonstration, the demand for bicycle-trailer service on the major route increased about 67 percent and for passengers with bicycles demand increased about 118 percent. The level of service increased 17 percent during the same time.

The number of bicycle-trailer paratransit passengers rose over the course of the demonstration with bicyclists usually representing about 20 percent of all paratransit riders. From June 1979 to November 1980 overall weekday paratransit patronage increased from 150 to 900 (from 150 to 570 on Route 13), and bicycle-user patronage increased from 31 to 174 (from 31 to 146 on Route 13). During the same period, the average

level of service increased 274 percent (164 percent on Route 13). During the demonstration itself, from November 1979 to November 1980, overall ridership increased 84 percent (passengers with bicycles by 129 percent), while the level of service increased by about 23 percent. Route 13 was the most successful in attracting all users, resulting in the SBMTD increasing the level of service on this route.

Total System Comparisons

> The bicycle-trailer option and the service changes on the routes were successful in attracting new riders to transit and in diverting some automobile users.

A comparison of SBMTD's ridership during the last quarter of 1979 and 1980 indicates the number of passengers with bicycles increased 70%. During the same period, paratransit ridership on the two major routes increased 46% (accompanied by increases in the level of service of 19%), while total SBMTD system patronage increased 15%. On-board surveys of riders who used a bicycle to access the bus service or who had a bicycle on the trailer indicate the demonstration services encouraged 12% of these riders to make new trips and diverted about 65% of the riders from previous modes of travel. Most diverted patrons used to only ride their bicycle although about one-third were former car drivers and passengers.

Seasonal Influences

> School holidays had a more significant impact on bicycle-trailer paratransit ridership than weather.

Paratransit ridership declined in general correspondence with the Santa Barbara schools' Easter, Summer and Christmas vacations. Demand peaked in the Fall, with the resumption of classes. A slightly decreased share of bicycles relative to total ridership occurred from December to March, when rain and lower temperatures prevailed.

Weekday versus Weekend

> Weekend bicycle-trailer users showed more response to changes in weather than weekday users.

Weekend ridership also increased over the course of the demonstration. Ridership was higher on Saturdays than on Sundays, whereas growth rates were higher on Sundays than Saturdays. The level of weekend services remained the same during the demonstration. For passengers without bicycles, seasonal ridership patterns on weekends and weekdays are similar. For bicyclists, however, ridership is lower during the rainy months of January and February and higher during the summer months.

Bicycle Facility Use

> Few bicycle rack sites were popular and lockers were rarely used.

The SBMTD installed 150 bicycle racks at 12 locations and 24 lockers at the Goleta Transit Center. Three rack sites received considerable use, with the greatest demand occurring around noon and on weekdays. The remaining rack sites were almost always vacant, and the lockers were only rented once.

Bicycle-Trailer User Characteristics

> The bicycle-trailer paratransit service was most popular with men, young adults and students, most of whom owned bicycles and had access to an automobile.

The majority of the bicycle-trailer users were 19 to 34 years of age and the service attracted very few elderly riders. More men than women seem to ride bicycles in Santa Barbara and thus took advantage of the service. Almost two-thirds of the users were students and almost one-third were employed. Practically all users owned bicycles and three-fourths of them had access to an automobile. One fourth to one-third had a car available for making that particular trip, but preferred to use the coordinated bicycle and transit option.

Trip Characteristics

> The bicycle-trailer paratransit service attracted proportionally more work and recreational trips than conventional transit, although the frequency of its use as a major mode of local travel declined.

Most paratransit trips were for school or work, with slightly larger shares of the work trips made by bicycle-accessed passengers. Bicycle-trailer users also made more recreational trips than other transit or auto users. While total ridership increased, there was a decrease in individual users' frequency of bus use, and the use of buses as the major mode of local travel dropped from 54% to 45%. Overall, this reflects the availability and use of a wide variety of travel alternatives in Santa Barbara.

Bicycle-Trailer User Attitudes

> Users felt that cost, convenience, energy-efficiency and safety were the best attributes and frequency and speed were the worst attributes of the bicycle-trailer services.

Increases in gasoline prices, the convenience of the paratransit services and concern for energy-efficiency were the most common reasons why people used the bicycle-trailer services. The frequency of the demonstration service and the speed to users' destinations were rated slightly worse than alternative modes of local travel. All other criteria, especially the cost, safety and convenience were, however, ranked as better than other modes. These attitudes may explain why many users who could travel by automobile preferred to use the demonstration services.

8.2.4 Economics and Efficiency

Minibuses versus Conventional Buses

> Minibuses were less costly on a per-vehicle-mile basis while conventional-sized buses were less costly on a per-passenger basis.

The SBMTD had to use minibuses to provide the bicycle-trailer services. Santa Barbara's overall costs for minibuses in 1979 were 32% less per vehicle-mile than for conventional-size buses. Most of this difference is due to the minibuses' better fuel economy. The bicycle-trailer minibus routes may also be more efficient because of express routing of these vehicles. Conventional-size buses, however, were distinctly superior on a per-passenger efficiency basis, because of their larger capacity. The cost per passenger averaged 64% higher and the number of passengers carried per mile averaged 72% lower for minibus service than for conventional bus service.

On the other hand, SBMTD deployed minibuses on routes where passenger demand did not warrant service by full-size buses. By coordinating minibus routes with bicycle-trailers SBMTD was also successful in attracting additional riders to transit. This strategy thus lowered the overall cost per passenger of operating these otherwise inefficient routes.

Capital Costs

> The SBMTD spent $37,500 to purchase and install 6 bicycle-trailers, 15 trailer hitches, 24 bicycle lockers and 150 bicycle racks.

For the demonstration, the SBMTD built six bicycle-trailers at a cost of $23,000. Fifteen trailer hitches totalled $1,500. They purchased 82 single-unit racks for $2,000, 69 double-unit racks for $3,500 and 24 lockers for $6,500. Installation expenses were about $1,000.

Operating Costs

> The annual operating cost of 4 trailers on 3 routes, including marketing, for the SBMTD coordinated bicycle and transit services were estimated between $49,500 and $68,800, depending on the costs assumed for additional running time.

Bicycle-trailer maintenance was fairly evenly divided between parts and labor, costing $3,000 per year. Cleaning four trailers averaged two hours of labor per week, for $1,000 annually. The bicycle-trailer service averaged $1.25 more per vehicle-hour based on an estimated increase in running time of 1 minute per bicycle-accessed passenger, for an annual additional maximum cost of about $19,300. Insurance premiums added another $20,000 and the SBMTD spent about $25,000 per year on marketing campaigns.

8.3 OTHER INTEGRATED BICYCLE AND TRANSIT PROJECTS

8.3.1 Park and Ride

Several other communities have integrated bicycles and transit services successfully. The most common means of integrating these services is to provide bicycle racks and/or lockers at convenient transit stops. In several areas bicycle parking facilities are provided along with automobile parking facilities for integrating Park and Ride services. In some cases, bikeways or special bicycle lanes can feed into these parking areas for bicyclist's convenient access to the transit services. Some examples of integrated bicycle parking and transit are in Buffalo, New York, Davis, California, Eugene, Oregon, New Haven, Connecticut, Santa Clara County, California, and Washington, D.C.

8.3.2 Bike and Bus

A more innovative approach is to allow bicyclists to bring their vehicles on the transit vehicle. The Division of Mass Transportation of the California Department of Transportation (Caltrans) sponsored three bike on bus demonstration projects. In San Diego a van and bicycle-trailer shuttled riders and bicyclists across the San Diego-Coronado Bridge. This service operated on half-hour headways during peak periods and hour headways during off-peak periods, everyday between April and October, 1975. Bicycle-trailer problems resulted in a new demonstration service --- bicycle racks were mounted on the rear of San Diego's regular coaches that crossed the Coronado Bridge. Headways averaged 45 minutes. Another demonstration was conducted in the San Francisco Bay Area, where one van and an 8-capacity bicycle-trailer provided integrated services for users crossing the Richmond-San Rafael Bridge in 1976 and 1977.

The Federal Highway Administration sponsored 41 Bikeway Demonstration Projects, in 36 different States during the late 1970's. Most of these projects focused on the construction of bicycle paths. A few, however, included bike on bus services.

For example, to discourage commuters from driving into downtown San Francisco, three vans pulling 10-capacity bicycle-trailers operated over the Bay Bridge during the peak periods on weekdays and on weekends between 1977 and 1979. Currently, one 12-passenger and 12-bicycle capacity van provides peak hour shuttle services between Oakland and San Francisco, across the Bay Bridge. Philadelphia, Pennsylvania, initiated an integrated bike and bus service, the New York Transit Authority operates special buses for bike riders between Manhattan and Staten Island across the Verazzano Bridge, and in Santa Cruz, California, the Metropolitan Transit District presently operates full-size transit coaches with bicycle racks mounted on the rear.

8.3.3 Bike on Rail

Although most of the bike and bus integration projects have been in California, a number of areas throughout the U.S. have implemented bike on rail services. In New York, the Port Authority Trans-Hudson (PATH) Corporation operating 14-miles of service between New Jersey and New York allows bicyclists to board the rail system during off-peak hours. Although a permit is required, no additional fare is charged for each bicyclist's trip. The METRO rail system in Washington, D.C. allows riders to bring their bicycles onto the train on Saturdays, Sundays and special holidays. Interested bicyclists must take a special safety training instruction session before a permit will be issued for use of the METRO integrated system. The Bay Area Rapid Transit (BART) system also allows bicyclists to enter and board rail cars during off-peak hours with a special user permit, and the Metropolitan Atlanta Rapid Transit Authority (MARTA) recently decided to allow bikes on its new rail system.

8.4 FUTURE APPLICATIONS

8.4.1 In Santa Barbara

The Santa Barbara Metropolitan Transit District experimented with integrating bicycles and transit for over six years. For one full year after the demonstration was over, the SBMTD continued to operate the same level of bicycle-trailer services provided during the demonstration. This is because the demonstration project was successful in integrating safe, secure and reliable bicycle storage facilities and bicycle-trailer services with transit and paratransit. The demonstration was also successful in achieving its primary objective of attracting additional riders to transit.

Despite these successes, because of the operational need to use small paratransit vehicles with the bicycle-trailers and because many of the routes duplicated regular service routes, the bicycle-trailer routes could only achieve very low productivities. The inability to use full-size transit coaches to provide the bicycle-trailer service prevented the SBMTD from combining these routes. The bicycle-trailer routes often operated at capacity, but, in comparison with the rest of the SBMTD system, the bicycle-trailer routes were inefficient economically.

Faced with federal operating assistance cutbacks, the SBMTD terminated services on all but one bicycle-trailer route in January 1982. The bicycle-trailer remains on Route 16, providing the only public transit service to Westmont College. For this service, the SBMTD receives direct subsidies from the college.

8.4.2 Bicycle-Trailer Services

In the near future, there appears to be a limited market for coordinating bicycle-trailers with transit services. During the demonstration, the SBMTD received letters from transit operators and groups in California, New Mexico and Oregon who had heard about the bicycle-trailer project and were interested in transferring this concept to their communities. But each of the areas that expressed interest were uniquely similar to Santa Barbara, in that they have favorable weather conditions and two of the communities have significant student populations.

In addition to being best suited to particular climatic and demographic features, there appears to be limited potential for these services because most U.S. transit operators maintain conventional size vehicles in their fleets. Most transit properties do not maintain fleets of minibuses that are suitable for pulling bicycle-trailers. This constraint may severely limit future applications of bicycle-trailer and transit services. Furthermore, many other transit operators are now also facing reduced levels of operating subsidies and will be looking for ways to cut back existing routes and services.

Cutbacks in routes will make transit accessible to fewer people. If fewer people can conveniently access transit, ridership and revenues will subsequently decline, forcing further cutbacks in service. To cost-effectively minimize the ridership and accompanying revenue losses associated with route cutbacks some operators may be interested in integrating bicycle parking facilities with shortened transit lines.

8.4.3 Bicycle Parking Facilities

The Santa Barbara demonstration found that the integration of bicycles and transit can significantly extend transit coverage, in terms of the population accessible to transit services. Bicyclists may be willing to ride slightly longer to cover a much further distance than pedestrians. Bicycle parking facilities may include bicycle racks and/or lockers depending on the location and the safety and security of the area. In Santa Barbara, the capital, installation and maintenance costs for these facilites totalled about $13,000. This may be a significant cost savings when compared to the costs of operating transit routes to some areas, where bicycling is a viable alternative to walking.

Appendix A

BICYCLE-TRAILER AND BICYCLE-RACK INFORMATION

Exhibit A.1

SBMTD Bicycle-Trailer Specifications

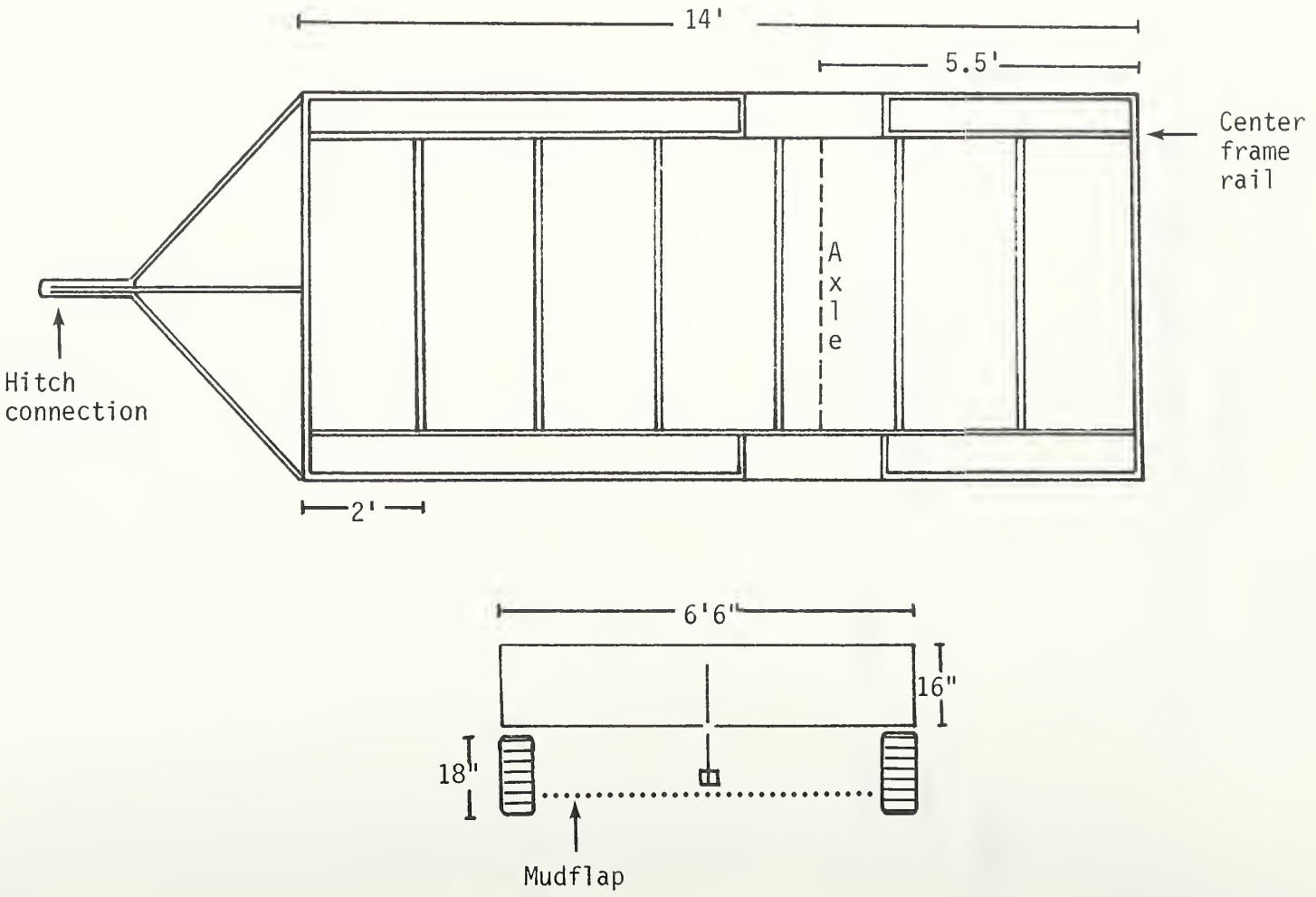

Exhibit A.2

Bicycle Storage at All Rack Locations

Location \ Time	February 1980			March 1980			April 1980			May 1980	June 1980	July 1980	Aug. 1980	October 1980														March 1981					April 1981				
	WD AM	WD PM	WD PM	WE AM	WE PM	WD PM	WD AM	WD NO	WD PM	WD AM	WD PM	WD AM	WE PM	WD AM	WD NO	WD PM	WD NI	WD AM	WD NO	WD PM	WD NI	WD AM	WD NO	WD PM	WD NI	WE AM	WE NO				AM	NO	PM	NI		AM	NO	PM	NI
Summerland Post Office	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0			WD	0	0	0	0	WD	0	0	0	0
Santa Barbara Transit Center	37	20	26	14	12	22	24	23	20	32	26	21	29	44	44	36	21	38	43	38	16	25	41	37	29	14	16			WE	21	30	25	14	WD	20	20	20	19
State/ Alamar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			WD	0	0	0	0	WD	0	0	0	0
Arrellaga/ Castillo	0	2	1	0	2	0	4	1	0	1	1	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0					2	2	2	0		2	2	2	0
Turnpike/ Hollister	1	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0			WD	0	0	0	0	WD	0	0	0	0
Patterson/ Cath. Oaks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			WE	0	0	0	0	WD	0	0	0	0
Fairview/ Cath. Oaks	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			WD	0	0	0	0	WE	0	0	0	0
Goleta Transit Center	1	0	1	2	1	3	3	2	6	5	5	4	4	4	8	9	9	2	7	10	7	5	6	9	7	9	9			WD	6	6	3	4	WD	13	10	10	10
Los Carneros/ El Colegio	1	0	1	0	1	0	1	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	2	1	1	0	0			WD	0	0	2	1		0	0	0	0
Storke/ Hollister	0	0	0	0	1	0	1	0	0	1	0	0	3	1	3	3	1	4	4	5	4	2	2	4	4	1	4			WD	1	1	0	0	WE	1	2	2	1
Castillo/ Montecito	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			WD	0	0	0	0	WD	0	0	0	0
Total	41	24	30	16	17	25	33	27	26	40	36	26	41	50	57	49	32	45	55	54	27	33	51	51	41	24	29													

Abbreviations: WD = weekdays, WE = weekends, AM = 7-9 a.m., NO = 9 a.m. - 2 p.m., PM = 2-4 p.m., NI = after 4 p.m.

Appendix B

ALL SURVEY FORMS AND RESULTS

Exhibit B.1

Pre-Demonstration Westmont College Student Survey Form

DRAFT

STUDENT QUESTIONNAIRE

Santa Barbara Metropolitan Transit District has been selected by the U.S. Urban Mass Transportation Administration for a "bicycle paratransit" demonstration project. Bike lockers or racks will be placed at important bus stops, and buses with specially equipped trailers will transport bicycles with their riders on selected routes.

We need your help in designing the most effective combination of bike storage facilities and bike-bus routes. Please answer the questions on this form and return it to the interviewer as soon as practicable.

1. Where do you live? (Local residence in Santa Barbara Area)

_____
(Street address or nearest intersection)

_____
(City or Area) (Zip code)

2. How do you normally commute to and from class?

( ) Drive Auto
( ) Carpool or auto passenger
( ) Bus (what lines?)
( ) Bicycle
( ) Motorbike, mo-ped, or scooter
( ) Walk
( ) Other (Please describe)

3. How often do you ride a bicycle?

( ) 5 times per week or more
( ) 1-4 times per week
( ) Less than once a week, but have ridden a bicycle during the last twelve months
( ) Have not ridden bicycle during last 12 months.

4. When you ride a bicycle, what are the usual purposes of riding -- and how much and how far do you ride for each purpose?

PURPOSE	TRIPS PER WEEK	MILES PER WEEK
Work		
School		
Social Visits		
Shopping Errands, etc		
Recreation at a specific place		
Exercise		
Sightseeing		
Just Riding		
Other (Describe)		

5. What population group do you belong to?

a. Age (Check Group)

( ) 15 or under
( ) 16 - 18
( ) 19 - 24
( ) 25 - 34
( ) 35 - 59
( ) 60 and Over

b. Sex

( ) M
( ) F

6. Do you maintain a car at your local residence?

( ) Yes
( ) No

7. If you do not ride a bicycle to class, what are your reasons for not riding? (Please check all correct answers)

( ) Too far, takes too long
( ) Want to shower after riding bike
( ) No safe place to put bike
( ) Feel unsafe cycling on main streets
( ) Car or bus more comfortable
( ) Bicycle stolen or needs repairs
( ) Don't own a bicycle
( ) Other (Please Describe)

Exhibit B.1 (Continued)

8. If a secure bike storage device were available at a bus stop, convenient to your home, how many more trips per week by bus would you make?

PURPOSE	MILES PER WEEK	MILES PER WEEK
Work		
School		
Social Visits		
Shopping, errands, etc		
Recreation (Specific Place)		
Recreation (Travel, Sightseeing		
Other (Describe)		

9. Should this storage device be a rack or an enclosed locker?

( ) Rack, coin operated lock
( ) Rack, free, you supply lock
( ) Enclosed locker, coin operated
( ) Enclosed locker, leased by the month, lock provided
( ) Enlcosed locker, free, you supply lock

10. If an express bus with a bicycle trailer had a stop within a mile of your home, how many trips would you make on this service?

PURPOSE	TRIPS PER WEEK	MILES PER WEEK
Work		
School		
Social Visits		
Shopping, errands, etc.		
Recreation (Specific Place)		
Recreation (Travel, Sightseeing, etc.		
Other (Describe)		

11. At what times would you want to use such a bike-bus? (Please check all correct answers.)

( ) Weekdays, 8 A.M. - 5 P.M.
( ) Weekdays, after 5 P.M.
( ) Weekends

Exhibit B.1 (Continued)

12. What is the maximum time that you would wait for such a bike-bus? (Please check best answer.)

( ) 5 minutes or less
( ) 6 - 10 minutes
( ) 11 - 15 minutes
( ) 16 - 20 minutes
( ) Over 20 minutes

THANK YOU VERY MUCH FOR YOUR HELP. PLEASE USE THE SPACE BELOW AND THE BACK OF THE FORM FOR ADDITIONAL COMMENTS.

Exhibit B.2

Pre-Demonstration UCSB Student Survey Form

Santa Barbara Metropolitan Transit District has been selected by the U. S. Urban Mass Transportation Administration for a "bicycle paratransit" demonstration project. Bike lockers or racks will be placed at important bus stops, and buses with specially equipped trailers will transport bicycles with their riders on selected routes.

We need your help in designing the most effective combination of bike storage facilities and bike-bus routes. Please answer the questions on this form and return it to the interviewer as soon as practicable. Please feel free to add comments at the end of the survey form. All answers will be confidential.

1. What is your local (i.e. college/university) residence?

   ( ) On Campus (Building _____)
   ( ) Off Campus (Address _____)

2. Do you maintain a car at your local residence?

   ( ) Yes
   ( ) No

3. Do you have a bicycle at your local residence?

   ( ) Yes
   ( ) No

4. How often do you ride a bicycle?

   ( ) 5 times per week or more
   ( ) 1-4 times per week
   ( ) Less than once a week, but have ridden a bicycle during the last twelve months
   ( ) Have not ridden bicycle during last 12 months

5. What population group do you belong to?

a. Age Group	b. Sex
( ) 15 or under	( ) M
( ) 16 - 18	( ) F
( ) 19 - 24	
( ) 25 - 34	
( ) 35 - 39	
( ) 60 and Over	

6. How often do you now ride Santa Barbara MTD buses?

   ( ) 5 times per week or more
   ( ) 1 - 4 times per week
   ( ) Less than once a week but have ridden bus during this academic year
   ( ) Have not ridden bus this academic year

7. If a secure bike storage device were available at a bus stop, within a comfortable 5-minute bicycle ride of your local residence, what effect would it have on your use of the buses?

   ( ) Would use bike storage, but would not increase bus rides per week
   ( ) Would use the bike storage and would make at least one extra bus trip per week
   ( ) Would not use bike storage, but would make at least one extra bus trip per week anyway
   ( ) Would not use bike storage or increase bus rides per week.

8. Should this storage device be a rack or an enclosed locker?

   ( ) Rack, free, you supply lock
   ( ) Enclosed locker, coin operated
   ( ) Enclosed locker, leased by the month, lock provided
   ( ) Enclosed locker, free, you supply lock

Exhibit B.2 (Continued)

9. Have you ever used the bike-trailer bus operated by the Santa Barbara Metropolitan Transit District between UCSB and Downtown Santa Barbara?

( ) Yes
( ) No

10. What changes would be necessary for you to use the bike-trailer more often? (Please indicate all correct answers.)

( ) Serve other destinations (which?) _____

_____

_____

( ) Run more frequently (how often?) _____

_____

( ) Run on weekends as well as weekdays.

( ) Improve reliability of bike-trailer service.

( ) Revise charge for bike-trailer use to _____

_____

( ) Improve design of trailer (how?) _____

_____

_____

( ) Would not use bike-trailer, regardless (why?)

_____

_____

_____

THANK YOU VERY MUCH FOR YOUR HELP. PLEASE USE THE SPACE BELOW AND THE BACK OF THE FORM FOR ADDITIONAL COMMENTS.

_____

_____

_____

_____

Exhibit B.3

Pre-Demonstration Housing Unit Survey Form (1978)

Santa Barbara Metropolitan Transit District has been selected by the U.S. Urban Mass Transportation Administration for a "bicycle paratransit" demonstration project. Bike lockers or racks will be placed at important bus stops, and buses with specially equipped trailers will transport bicycles with their riders on selected express bus routes.

We need your help in designing the most effective combination of bike storage facilities and bike-bus routes. Please answer the questions on this form and return the bottom part to the driver of any SBMTD bus, who will accept it in lieu of one cash fare. The form can also be returned by mail, and postage will be paid by SBMTD. Please feel free to add comments at the end of the survey form.

1. What type of bike storage device would be preferred by persons in your household? (Please check all correct answers, as combinations will be possible.)

   ( ) Regular rack, rider supplies lock
   ( ) High security (frame) rack, rider supplies lock
   ( ) Locker, leased (about $2 per month) with special lock and key
   ( ) Locker, free but rider has to supply lock
   ( ) Other (describe) _____

2. How often would people residing in your household use the bike trailer bus? (Please describe below and also indicate their age and present use of MTD buses.)

AGE OF PERSON	BUS TRIPS LAST WEEK	BIKE TRAILER TRIPS PER WEEK Weekdays	Weekends	Total	WHERE SHOULD IT GO TO?

THANK YOU VERY MUCH FOR YOUR HELP. PLEASE USE THE SPACE BELOW FOR ADDITIONAL COMMENTS.

_____

_____

_____

Exhibit B.4

Pre-Demonstration County Employee Survey Form

Santa Barbara Metropolitan Transit District has been selected by the U.S. Urban Mass Transportation Administration for a "bicycle paratransit" demonstration project. Bike lockers or racks will be placed at important bus stops, and buses with specially equipped trailers will transport bicycles with their riders on selected routes.

We need your help in designing the most effective combination of bike storage facilities and bike-bus routes. Please answer the questions on this form and return it to the County Personnel Department as soon as possible. Please feel free to add comments at the end of the survey form. All answers will remain confidential.

1. Where do you live?

_____
(Street Address or Nearest Intersection)

_____ _____
(City or Area) (Zip Code)

2. How do you normally commute to and from work?

( ) Drive auto
( ) Carpool or auto passenger
( ) Bus (What Lines?) _____
( ) Bicycle
( ) Motorbike, mo-ped, or scooter
( ) Walked
( ) Other (Please Describe)_____

3. How often do you ride a bicycle?

( ) 5 times per week or more
( ) 1 - 4 times per week
( ) Less than once a week, but have ridden in the last 12 months
( ) Have not ridden a bike in over 12 months.

Exhibit B.4 (Continued)

4. What population group do you belong to?

a. Age (Check Group)	b. Sex
( ) 15 or under	( ) M
( ) 16 - 18	( ) F
( ) 19 - 24	
( ) 25 - 34	
( ) 35 - 39	
( ) 60 and Over	

5. Do you own a bicycle?

( ) Yes
( ) No

6. How many cars are available to your household? _____

7. How often do you now ride Santa Barbara MTD buses?

( ) 5 times per week or more
( ) 1 - 4 times per week
( ) Less than once a week but have ridden bus during 1978
( ) Have not ridden bus in 1978

8. If a secure bike storage device were available at a bus stop, within a 5-minute bicycle ride of your residence, what effect would it have on your use of the buses?

( ) No effect likely
( ) Would use bike storage and would make same number of bus trips on more frequent line
( ) Would use the bike storage and would make at least one extra bus trip per week
( ) Would not use bike storage, but would make at least one extra bus trip per week anyway
( ) Would use bike storage instead of walking to present bus
( ) Other (describe)_____

9. Should this storage device be a rack or an enclosed locker?

( ) Regular rack, free, you supply lock, chain, etc.
( ) High security (frame) rack, free, you supply lock
( ) Enclosed locker, leased ($2 a month), special key
( ) Enclosed locker, free, you supply lock.

Exhibit B.4 (Continued)

10. Have you ever used the bike-trailer bus operated by the Santa Barbara Metropolitan Transit District between UCSB and Downtown Santa Barbara?

    ( ) Yes
    ( ) No

11. What changes would be necessary to make the bike-trailer attractive to you? (Please indicate all correct answers.)

    ( ) Serve other destinations (which?) _____

    _____

    _____

    ( ) Run more frequently (how often?) _____

    _____

    ( ) Run on weekends as well as weekdays.

    ( ) Improve reliability of bike-trailer service.

    ( ) Revise charge for bike-trailer use to _____

    _____

    ( ) Improve design of trailer (how?) _____

    _____

    ( ) Other (describe) _____

    _____

12. How often would you use the bike-trailer if these changes were made?

    ( ) Five times a week or more
    ( ) One to four times a week
    ( ) Less than once a week
    ( ) Would not use it regardless (Why not?) _____

    _____

THANK YOU VERY MUCH FOR YOUR HELP. PLEASE USE THE SPACE BELOW AND THE BACK OF THE FORM FOR ADDITIONAL COMMENTS.

_____

_____

_____

_____

Exhibit B.5

1978 On-Board Passenger Survey Form and Results

Santa Barbara METROPOLITAN TRANSIT District

PASSENGER SURVEY

You can help us improve bus service by answering ALL of the following questions. PLEASE ANSWER EVEN IF YOU HAVE ALREADY FILLED ONE OUT. Then drop in container at door, or return it to survey taker. All replies will be kept confidential.

1. HOW DID YOU GET TO THE BUS STOP WHERE YOU BOARDED THIS BUS?
   - Walked (Number of Minutes) ____ ☐
   - Bike ☐
   - Drove ☐
   - Auto Passenger ☐
   - Transferred from bus line _____ ☐

2. AT WHICH STREET INTERSECTION DID YOU GET ON THIS BUS?

   _____ and _____

3. WHICH FARE DID YOU PAY?
   - Regular (25¢) ☐
   - UCSB Student ☐
   - Senior Citizen (10¢) ☐
   - Handicapped (10¢) ☐
   - Student Ticket ☐

4. WHAT IS THE MAIN PURPOSE OF THIS TRIP? (For example, a trip from school to home is a "School" trip)
   - Work ☐
   - School ☐
   - Shopping ☐
   - Social, recreation ☐
   - Medical ☐
   - Other _____ ☐

5. AT WHICH STREET INTERSECTION WILL YOU GET OFF THIS BUS?

   _____ and _____

6. WAS A CAR AVAILABLE TO YOU FOR THIS TRIP?
   - No (Bus only practical means) ☐
   - Yes, but with considerable inconvenience to others ☐
   - Yes, but I prefer to take the bus ☐

7. HOW OFTEN DO YOU RIDE THE BUS?
   - 5 or more days a week ☐
   - 1 to 4 days a week ☐
   - Less than once a week ☐

8. TO CONTINUE PRESENT BUS SERVICES IT MAY BE NECESSARY TO INCREASE FARES. WHICH WOULD YOU PREFER?
   - Raise fares to maintain existing bus service ☐
   - Provide less bus service at existing fares ☐

9. WHAT IS YOUR AGE?
   - 15 or under ☐
   - 16 to 18 ☐
   - 19 to 24 ☐
   - 25 to 34 ☐
   - 35 to 59 ☐
   - 60 or over ☐

Please use this space for any comments you have about SBMTD bus service.

21001

THANK YOU FOR HELPING US SERVE YOU BETTER.

Exhibit B.5 (Continued)

Results of the SBMTD Passenger Survey

(April 1978)

Results are presented separately for passengers who chose the bicycle (B) or other access modes (NB) to reach the bus stop of their trip origin.

	B	NB	All
Travel Mode to Bus Stop	(n=162)	(n=10565)	(n=10727)
Drove myself	0.0	1.2	1.2
Auto passenger	0.0	2.3	2.3
Bus transfer	0.0	14.8	14.6
Bicycle	100.0	0.0	1.5
Walked	0.0	81.7	80.4
Total	100.0	100.0	100.0
If walked, time			(n=7684)
2 minutes or less			30.3
3 to 5 minutes			45.3
6 or more minutes			24.4
Total			100.0
Kind of Fare Paid	(n=159)	(n=10643)	(n=10802)
Regular (25¢)	54.1	64.6	64.4
UCSB Student	40.9	20.1	20.4
Senior Citizen	1.3	10.4	10.3
Handicapped	0.0	1.7	1.7
Student ticket	3.8	3.1	3.1
Total	100.0	100.0	100.0
Trip Purpose	(n=159)	(n=10709)	(n=10868)
School	31.4	40.1	40.0
Work	32.7	28.8	28.9
Shopping	12.6	10.1	10.1
Medical	1.9	4.7	4.6
Social, Recreation	10.7	7.1	7.1
Other	10.7	9.3	9.3
Total	100.0	100.0	100.0
Car Availability for Trip	(n=156)	(n=10417)	(n=10573)
No	65.4	67.1	67.1
Yes, inconveniently	11.5	13.4	13.3
Yes, conveniently	23.1	19.5	19.6
Total	100.0	100.0	100.0

Exhibit B.5 (Continued)

Frequency of Bus Travel	(n=157)	(n=10517)	(n=10674)
5 or more days per week	43.9	56.4	56.3
1 to 4 days per week	35.7	33.4	33.4
Less than once per week	20.4	10.2	10.4
Total	100.0	100.0	100.0
Preference for Fare Increase or Service Cutbacks	(n=146)	(n=9637)	(n=9783)
Fare increase	79.5	73.2	73.3
Service cutbacks	20.5	26.8	26.7
Total	100.0	100.0	100.0
Respondent's Age	(n=158)	(n=10599)	(n=10757)
15 or younger	9.5	17.0	16.9
16 to 18	5.7	14.0	13.9
19 to 24	61.4	29.5	30.0
25 to 34	17.1	16.0	16.1
35 to 59	3.2	11.0	10.9
60 or older	3.2	12.4	12.3
Total	100.0	100.0	100.0

Exhibit B.6

1979/1980 On-Board Passenger Survey Form and Results

TO BE FILLED IN BY SURVEYOR:
Date:
Time:
Route:

BICYCLE TRAILER/BUS RIDER SURVEY

To help in evaluating Santa Barbara's Bicycle/Bus Service, would you take a few minutes to complete this survey? Please return completed questionnaires to the surveyor.

1. Where did you board this bus? _____
(Street Intersection or Landmark)

2. How did you get to the bus stop where you boarded?

1( ) Walked
2( ) Bicycled
3( ) Transferred from Bus Route #___
4( ) Drove myself
5( ) Driven by someone else
6( ) Other, How? _____

3. Where did you start from initially? _____
(Address or Closest Intersection)

4. How long did it take you to get to the bus stop? _____ minutes

5. What is the main purpose of this trip? (For example, a trip from school to home is a "school" trip.)

1( ) School, Which? _____
2( ) Work
3( ) Shopping
4( ) Medical or dental appointment
5( ) Visiting
6( ) Recreation
7( ) Other, What? _____

6. Where will you get off this bus? _____
(Closest Intersection or Landmark)

7. Where will you go after getting off the bus? _____
(Address or Closest Intersection)

8. How will you get from the bus stop to your destination?

1( ) Walk
2( ) Bicycle
3( ) Transfer to another bus, Route #_____
4( ) Drive myself
5( ) Driven by someone else
6( ) Other, How? _____

9. How long will it take you to get to your destination from the bus stop?
_____ minutes

10. Was a car available for you for this trip?

1( ) No (Skip to Question #12)
2( ) Yes, but with considerable inconvenience to others (Skip to Question #12)
3( ) Yes, without inconvenience to myself or others

11) Why did you take this bus rather than using your car?

1( ) Gasoline has gotten too expensive
2( ) Bike/Bus is more convenient
3( ) Wanted to bring my bike along
4( ) Wanted exercize
5( ) Bike/Bus is more energy-efficient
6( ) Other, Explain: _____

12. If you had made this trip before June 1979, how would you have done it?

1( ) Would not have made trip
2( ) Drove myself
3( ) Driven by someone else
4( ) Bicycle
5( ) SBMTD Bus, What Route? _____
6( ) Walked
7( ) Other, How? _____

13. How often do you ride this bicycle trailer bus?

1( ) 4 or more days a week
2( ) 1-3 days a week
3( ) Less than once a week
4( ) Less than once a month

14. How do you do most of your local traveling?

1( ) Bicycle trailer buses (Skip to Question #16)
2( ) Other SBMTD buses
3( ) Bicycle
4( ) Walk
5( ) Drive myself
6( ) Driven by others
7( ) Other, How? _____

Exhibit B.6 (Continued)

15. Compared to what you use for most of your local travel, how would you rate the bicycle trailer bus service in terms of:

	Much Better	Better	About the Same	Worse	Much Worse
Convenience	( )	( )	( )	( )	( )
Ease of Use	( )	( )	( )	( )	( )
Safety	( )	( )	( )	( )	( )
Speed of Reaching Your Destination	( )	( )	( )	( )	( )
Frequency of Service	( )	( )	( )	( )	( )
Security	( )	( )	( )	( )	( )
Reliability	( )	( )	( )	( )	( )
Comfort	( )	( )	( )	( )	( )
Cost	( )	( )	( )	( )	( )

16. Do you have a bicycle on the trailer?

1( ) No (Skip to Question #20)
2( ) Yes

17. What kind of bicycle is it?

1( ) 10-speed
2( ) 5-speed or 3-speed
3( ) Single speed, standard size
4( ) High-rise, small wheel
5( ) Other, Describe: _____

18. Do you feel your bicycle is securely fastened to the trailer?

1( ) Yes 2( ) No 3( ) Don't know

19. Have you had any personal accidents or damage to your bicycle from using this bus trailer service?

1( ) No accidents or damage
2( ) Personal accident, describe (date & incident):_____
_____
3( ) Bicycle damage, describe (date & incident):_____
_____

20. Are you: 1( ) A student 2( ) A homemaker 3( ) Employed 4( ) Retired 5( ) Not currently employed

21. Are you: 1( ) Female 2( ) Male

22. What is your age? 1( ) 15 or under 2( ) 16 to 18 3( ) 19 to 24 4( ) 25 to 34 5( ) 35 to 59 6( ) 60 or over

23. How many automobiles are owned or operated by members of your household? ____ cars

24. Do you have a valid driver's license? 1( ) Yes 2( ) No

25. Do you own a bicycle? 1( ) Yes 2( ) No

26. How did you first learn about this service?

1( ) Used previous Route 13 bus/bicycle trailer service
2( ) Saw it operating
3( ) Newspaper
4( ) Radio
5( ) Friends
6( ) Bicycle shop or organization
7( ) Other, How? _____

Thank you for completing this survey. Please use the space below for any comments or suggestions you may have concerning Santa Barbara's bike trailer bus or regular transit service.

Exhibit B.6 (Continued)

Results of the Santa Barbara Bicycle-Trailer/Bus Rider Survey

	1979	1980
Bicycle-Trailer Routes Surveyed	(n=771)	(n=1201)
Route 8	0.1	0.0
Route 9	40.7	0.0
Route 12	0.0	8.2
Route 13 (incl. 13B)	49.0	69.7
Route 16	10.1	22.1
Total	100.0	100.0
Travel Mode to Bus Stop	(n=692)	(n=975)
Drove myself	2.0	1.3
Auto passenger	2.2	3.2
Bus transfer	20.1	16.8
Bicycle	11.8	23.0
Walk	63.0	54.3
Other	0.9	1.4
Total	100.0	100.0
Bus Stop Access Time	(n=738)	(n=923)
Mean time (minutes)	7.7	9.9
Trip Purpose	(n=724)	(n=959)
School	47.0	29.8
Work	25.4	26.3
Shopping	11.5	16.4
Medical	2.3	1.8
Visiting	4.3	8.1
Recreation	2.1	10.2
Other	7.5	7.4
Total	100.0	100.0
Bus Stop Egress Mode (question asked 1980 only)		(n=959)
Drive myself		1.1
Auto passenger		1.4
Bus transfer		9.6
Bicycle		21.1
Walk		65.6
Other		1.3
Total		100.0

Exhibit B.6 (Continued)

	1979	1980
Bus Stop Egress Time	(n=713)	(n=895)
Mean time (minutes)	7.9	8.5
Car Availability for Trip	(n=732)	(n=938)
No	66.0	64.9
Yes, inconveniently	9.4	11.1
Yes, conveniently	24.6	24.0
Total	100.0	100.0

Reason for Preference of Bicycle-Trailer Service over Automobile (question asked 1980 only)	(n=257)
Gasoline too expensive	52.1
Bicycle-trailer more convenient	13.2
Wanted to bring bicycle along	7.0
Wanted exercise	7.4
Bicycle-trailer more energy-efficient	13.2
Other	7.0
Total	100.0

Travel Mode for Same Trip before June 1979	(n=677)	(n=865)
Would not have made trip	12.9	14.7
Would have driven myself	18.5	23.5
Auto passenger	7.1	12.8
Other bus routes	15.2	16.3
Bicycle	39.6	25.5
Walk	4.0	3.4
Other	2.8	3.8
Total	100.0	100.0
Frequency of Use of Bicycle-Trailer Service	(n=737)	(n=918)
4 or more days per week	41.4	34.6
1 to 3 days per week	35.8	33.3
Less than once per week	14.0	19.0
Less than once per month	8.8	13.1
Total	100.0	100.0
Major Mode of Local Travel	(n=740)	(n=869)
Drive myself	13.9	13.6
Auto passenger	5.4	7.1
Bicycle-trailer service	17.0	16.3
Other bus routes	36.6	28.8
Bicycle	18.2	22.0
Walk	7.2	10.8
Other	1.6	1.4
Total	100.0	100.0

Exhibit B.6 (Continued)

	1979	1980
Comparison between Bicycle-Trailer Service and Usual Travel Mode		
A. Convenience	(n=594)	(n=703)
Much better	27.3	31.7
Better	24.4	25.0
About the same	37.0	27.7
Worse	9.4	13.1
Much worse	1.9	2.4
Total	100.0	100.0
B. Ease of Use	(n=556)	(n=670)
Much better	25.4	23.7
Better	25.0	27.3
About the same	39.0	33.7
Worse	9.9	13.3
Much worse	0.7	1.9
Total	100.0	100.0
C. Safety	(n=535)	(n=650)
Much better	27.3	26.2
Better	24.3	26.0
About the same	44.7	41.1
Worse	3.4	4.6
Much worse	0.4	2.2
Total	100.0	100.0
D. Speed to Destination	(n=555)	(n=664)
Much better	24.9	26.2
Better	20.2	20.3
About the same	32.6	27.6
Worse	17.3	20.9
Much worse	5.0	5.0
Total	100.0	100.0
E. Frequency of Service		(n=647)
Much better		17.8
Better		19.3
About the same		36.6
Worse		22.3
Much worse		4.0
Total		100.0
F. Security	(n=512)	(n=633)
Much better	21.7	20.4
Better	23.0	23.7
About the same	49.2	49.1
Worse	5.5	5.1
Much worse	0.6	1.7
Total	100.0	100.0

Exhibit B.6 (Continued)

	1979	1980
G. Reliability	(n=525)	(n=642)
Much better	22.9	21.7
Better	23.0	25.5
About the same	45.7	42.7
Worse	7.0	7.8
Much worse	1.3	2.3
Total	100.0	100.0
H. Comfort	(n=540)	(n=652)
Much better	22.4	20.7
Better	21.1	24.7
About the same	42.2	35.4
Worse	12.6	16.4
Much worse	1.7	2.8
Total	100.0	100.0
I. Cost	(n=544)	(n=659)
Much better	38.4	39.0
Better	17.1	17.0
About the same	35.5	32.8
Worse	7.4	7.7
Much worse	1.7	3.5
Total	100.0	100.0
Respondent Presently Has Bicycle on Trailer	(n=679)	(n=847)
Yes	15.0	24.4
No	85.0	75.6
Total	100.0	100.0
Kind of Bicycle on Trailer	(n=115)	(n=207)
10-speed	79.1	83.6
5, 3-speed	13.0	6.3
Single speed	3.5	7.7
High rise	0.9	0.5
Other	3.5	1.9
Total	100.0	100.0
Bicycle Is Fastened Securely on Trailer	(n=110)	(n=209)
Yes	85.5	84.2
No	6.4	5.3
Don't know	8.2	10.5
Total	100.0	100.0

Exhibit B.6 (Continued)

	1979	1980
Personal Accidents or Bicycle Damage Caused by Trailer	(n=110)	(n=215)
Personal accident	0.9	0.0
Bicycle damage	10.9	3.7
No accidents or damage	88.2	96.3
Total	100.0	100.0
Respondent's Occupation	(n=695)	(n=840)
Employed	23.9	31.2
Student	69.2	60.5
Retired	2.9	2.4
Homemaker	2.2	3.1
Not currently employed	1.9	2.9
Total	100.0	100.0
Respondent's Sex	(n=666)	(n=794)
Female	53.5	49.0
Male	46.5	51.0
Total	100.0	100.0
Respondent's Age	(n=692)	(n=838)
15 or younger	7.7	12.2
16 to 18	15.9	13.1
19 to 24	37.0	39.5
25 to 34	24.9	22.7
35 to 59	11.1	9.4
60 or older	3.9	3.1
Total	100.0	100.0
Number of Cars in Respondent's Household	(n=536)	(n=786)
None	49.3	15.5
1		35.1
2	25.7	24.4
3	15.7	13.2
4 to 6	9.0	10.7
7 or more	0.2	1.0
Total	100.0	100.0
Driver's License	(n=680)	(n=839)
Yes	76.9	73.1
No	23.1	26.9
Total	100.0	100.0

Exhibit B.6 (Continued)

	1979	1980
Bicycle Ownership	(n=677)	(n=828)
Yes	75.2	73.3
No	24.8	26.7
Total	100.0	100.0
Source of Information about Bicycle-Trailer Service	(n=671)	(n=830)
Used previous Route 13	20.3	20.4
Saw it operating	49.0	45.5
Newspaper	1.6	2.7
Radio	0.1	1.7
Friends	15.4	20.0
Bicycle shop	0.1	0.6
Other	13.4	9.2
Total	100.0	100.0

Exhibit B.7

1979/1980 Bicycle Rack User Survey Form and Results

Date:

Time:

Location:

BICYCLE RACK SURVEY

To help in evaluating Santa Barbara's Bike Rack and Bus Service, would you take a few minutes to complete this survey? Please return completed addressed questionnaires to Santa Barbara's Metropolitan Transit District, place in the survey box, or return to the bus driver. Thank you.

1. Did you just get off the bus?

   1( ) Yes, Which Route? _____
   2( ) No (Skip to Question #5)

2. Where did you board the bus? _____
   (Closest Intersection or Landmark)

3. How did you get to the bus stop where you boarded?

   1( ) Walked
   2( ) Bicycled
   3( ) Transferred from Bus Route #____
   4( ) Drove myself
   5( ) Driven by someone
   6( ) Other, How? _____

4. How long did it take you to get to that bus stop? _____ minutes

5. Where will you ride your bike now? _____
   (Closest Intersection or Landmark)

6. How long will it take you to get to this destination? _____ minutes

7. What kind of bicycle do you have?

   1( ) 10-speed
   2( ) 5-speed or 3-speed
   3( ) Single speed, standard
   4( ) High-rise, small wheel
   5( ) Other, describe: _____

8. How would you rate these bicycle racks in terms of:

	Excellent	Good	Average	Below Average	Poor
Convenient Location	( )	( )	( )	( )	( )
Security	( )	( )	( )	( )	( )
Ease of Use	( )	( )	( )	( )	( )
Reliability	( )	( )	( )	( )	( )

9. Have you had any personal accidents or damage to your bicycle from using these facilities?

   1( ) No accidents or damage
   2( ) Personal accident, describe: (date, incident) _____
   _____
   3( ) Bicycle accident, describe: (date, incident) _____
   _____

10. What was the main purpose of today's trip? (For example, a trip from school to home is a "school" trip.)

    1( ) School, Which? _____
    2( ) Work
    3( ) Shopping
    4( ) Medical or dental appointment
    5( ) Visiting
    6( ) Recreation
    7( ) Other, What? _____
    _____

11. Was a car available to you for this trip?

    1( ) No (Skip to Question #13)
    2( ) Yes, but with considerable inconvenience to others (Skip to Question #10)
    3( ) Yes, without inconvenience to myself or others

12. Why did you not use your car?

    1( ) Gasoline has gotten too expensive
    2( ) Bike/Bus is more convenient
    3( ) Wanted exercize
    4( ) Bike/Bus is more energy-efficient
    5( ) Other, Explain _____

Exhibit B.7 (Continued)

13. If you had made this trip before bike racks were installed here, how would you have done it?

1( ) Same way, but locking bicycle to something else (Skip to Question #15)
2( ) Would not have made trip (Skip to Question #15)
3( ) Drove myself
4( ) Driven by someone
5( ) Bicycled entire trip
6( ) Walked to bus route
7( ) Walked
8( ) Other, How? _____

14. Does making the trip today take more or less time than this previous way?

1( ) Faster using today's choice
2( ) Faster using previous mode
3( ) Don't know

15. How do you do most of your local traveling?

1( ) SBMTD buses
2( ) Bicycle
3( ) Walk
4( ) Drive myself
5( ) Driven by others
6( ) Other, How? _____

16. How often do you currently ride the bus?

1( ) 4 or more days a week
2( ) 1-3 days a week
3( ) Less than once a week
4( ) Less than once a month

17. Are you:

1( ) A student
2( ) A homemaker
3( ) Employed
4( ) Retired
5( ) Not currently employed

18. Are you: 1( ) Female 2( ) Male

19. What is your age?

1( ) 15 or under
2( ) 16 to 18
3( ) 19 to 24
4( ) 25 to 34
5( ) 35 to 59
6( ) 60 or over

20. How many automobiles are owned or operated by members of your household?

_____ cars

21. Do you have a valid driver's license? 1( ) Yes 2( ) No

Thank you for completing this survey. Please use the space below for any comments or suggestions you may have concerning Santa Barbara's transit service.

Exhibit B.7 (Continued)

Results of the Santa Barbara Bicycle-Rack User Survey

	1979	1980
Bicycle Rack Access Mode	(n=17)	(n=19)
Bus	64.7	68.4
Other than bus	35.3	31.6
Total	100.0	100.0
Trip Origin	(n=11)	(n=13)
UCSB campus	63.6	46.2
Santa Barbara Transit Center	9.1	15.4
Other	22.3	38.4
Total	100.0	100.0
Travel Mode to Bus Stop	(n=11)	(n=13)
Drove myself	0.0	0.0
Auto passenger	0.0	0.0
Bicycle	18.2	23.1
Bus transfer	0.0	7.7
Walked	81.8	69.2
Total	100.0	100.0
Bus Stop Access Time	(n=10)	(n=14)
2 minutes or less	20.0	7.1
3 to 5 minutes	70.0	57.1
6 to 10 minutes	0.0	21.4
11 to 20 minutes	10.0	7.1
More than 20 minutes	0.0	7.1
Total	100.0	100.0
Mean access time (minutes)	5.2	7.9
Median access time (minutes)	3.3	4.3
Time to Final Destination	(n=16)	(n=15)
2 minutes or less	0.0	0.0
3 to 5 minutes	56.3	33.3
6 to 10 minutes	31.3	46.7
11 to 20 minutes	0.0	20.0
More than 20 minutes	12.5	0.0
Total	100.0	100.0
Mean time (minutes)	9.2	9.1
Median time (minutes)	4.7	6.8

Exhibit B.7 (Continued)

	1979	1980
Kind of Bicycle	(n=16)	(n=15)
10-speed	72.2	89.5
5, 3-speed	11.1	5.3
Single speed	16.7	5.3
Total	100.0	100.0
Rating of Bicycle Racks		
A. Convenient Location	(n=18)	(n=19)
Excellent	44.4	57.9
Good	27.8	42.1
Average	22.2	0.0
Poor	5.6	0.0
Total	100.0	100.0
B. Security	(n=17)	(n=18)
Excellent	0.0	16.7
Good	23.5	38.9
Average	41.2	38.9
Below average	5.9	0.0
Poor	29.4	5.6
Total	100.0	100.0
C. Ease of Use	(n=16)	(n=18)
Excellent	0.0	16.7
Good	6.3	16.7
Average	12.5	33.3
Below average	12.5	22.2
Poor	68.8	11.1
Total	100.0	100.0
D. Reliability	(n=14)	(n=18)
Excellent	0.0	16.7
Good	0.0	27.8
Average	14.3	5.6
Below average	21.4	16.7
Poor	64.3	33.3
Total	100.0	100.0
Personal Accidents or Bicycle Damage Caused by Bicycle Racks	(n=17)	(n=19)
Personal accidents	5.9	0.0
Bicycle damage	29.4	10.5
No accidents or damage	64.7	89.5
Total	100.0	100.0

Exhibit B.7 (Continued)

	1979	1980
Trip Purpose	(n=18)	(n=19)
School	61.1	42.1
Work	33.3	36.8
Medical	5.6	0.0
Recreation	0.0	5.3
Other	0.0	15.8
Total	100.0	100.0
Car Availability for Trip	(n=16)	(n=19)
No	50.0	63.2
Yes, inconveniently	18.8	0.0
Yes, conveniently	31.2	36.8
Total	100.0	100.0
Reason for Preference of Bicycle over Automobile	(n=11)	(n=11)
Gasoline too expensive	72.7	54.5
Bicycle/bus more convenient	9.1	9.1
Wanted exercise	0.0	27.3
Bicycle/bus more energy-efficient	9.1	9.1
Other	9.1	0.0
Total	100.0	100.0
Travel Mode for Same Trip before Bicycle Rack Installation	(n=16)	(n=18)
Same way, but locking bike to something else	81.2	77.8
Would not have made trip	0.0	5.6
Drove myself	6.3	0.0
Auto passenger	6.3	0.0
Bicycled entire trip	6.3	16.7
Total	100.0	100.0
Speed Comparison of Previous and Present Travel Modes	(n=5)	(n=10)
Faster today	20.0	50.0
Faster previously	20.0	20.0
Don't know	60.0	30.0
Total	100.0	100.0

Exhibit B.7 (Continued)

	1979	1980
Major Mode of Local Travel	(n=18)	(n=19)
Drive myself	5.6	5.3
Auto passenger	0.0	0.0
Bus	61.1	42.1
Bicycle	27.8	47.4
Walk	5.6	0.0
Other	0.0	5.3
Total	100.0	100.0
Frequency of Bus Travel	(n=18)	(n=19)
4 or more days per week	94.4	68.4
1 to 3 days per week	5.6	15.8
Less than once per week	0.0	15.8
Total	100.0	100.0
Respondent's Occupation	(n=18)	(n=18)
Employed	22.2	38.9
Student	77.8	55.6
Homemaker	0.0	5.6
Total	100.0	100.0
Respondent's Sex	(n=17)	(n=18)
Female	41.2	33.3
Male	58.8	66.7
Total	100.0	100.0
Respondent's Age	(n=18)	(n=19)
15 or younger	5.6	5.2
16 to 18	0.0	5.2
19 to 24	55.6	10.6
25 to 34	27.8	63.2
35 to 59	11.1	15.8
60 or older	0.0	0.0
Total	100.0	100.0
Number of Cars in Respondent's Household	(n=17)	(n=18)
None	29.4	27.8
1	35.3	44.4
2	23.5	22.2
3	11.8	5.6
Total	100.0	100.0

Exhibit B.8

1979 Student Opinion Survey Form and Results

To help in evaluating Santa Barbara's Bicycle/Bus Service, would you take a few minutes to complete this survey? Please use the back of this form for any comments or suggestions you may have concerning Santa Barbara's bike trailer bus or regular transit service, and return this questionnaire to _____.

1. Where is your local residence?

   1( ) On-campus (Building: _____)
   2( ) Off-campus (Address: _____)

2. Do you have a car at your local residence?

   1( ) Yes 2( ) No

3. Do you have a valid driver's license?

   1( ) Yes 2( ) No

4. Do you have a bicycle at your local residence?

   1( ) Yes 2( ) No (Skip to Question #7)

5. What kind of a bicycle is it?

   1( ) 10-speed
   2( ) 5-speed or 3-speed
   3( ) Single-speed, standard
   4( ) High-rise, small wheel
   5( ) Other, describe _____

6. How often do you ride a bicycle?

   1( ) 4 or more times a week
   2( ) 1-3 times a week
   3( ) Less than once a week
   4( ) Less than once a month

7. How do you do most of your local traveling?

   1( ) Drive myself
   2( ) Driven by someone
   3( ) Bicycle
   4( ) Bus, Which Routes? _____
   5( ) Walk
   6( ) Other, How? _____

8. How often do you use local Santa Barbara MTD buses?

   1( ) 4 or more days a week
   2( ) 1-3 days a week
   3( ) Less than once a week
   4( ) Less than once a month
   5( ) Never ride the bus (Skip to Question #10)

9. Have you ever used your bicycle for getting to and from the bus stop?

   1( ) Yes...what stops? _____
   2( ) No

10. Have you heard about SBMTD's bicycle trailer bus service?

    1( ) No (Skip to Question #13)
    2( ) Yes. . . Where did you hear about it?

    a( ) Saw it operating
    b( ) Newspapers
    c( ) Brochures/flyers
    d( ) Friends
    e( ) Bicycle shop or organization
    f( ) Other, Where? _____

11. Have you ever used the bike trailer bus service?

    1( ) No
    2( ) Yes. . .When did you use it last?

    a( ) Before January 1978
    b( ) Between January 1978 and May 1978
    c( ) After June 1979

12. Comparing your experience or what you've heard about the bicycle trailer bus service to your usual way of traveling (answer to Question #7), how would you rate the bicycle trailer bus service in terms of:

	Better	Better	About Same	Worse	Worse
Convenience	( )	( )	( )	( )	( )
Ease of use	( )	( )	( )	( )	( )
Safety	( )	( )	( )	( )	( )
Speed of reaching your destination	( )	( )	( )	( )	( )
Frequency of service	( )	( )	( )	( )	( )
Security	( )	( )	( )	( )	( )
Reliability	( )	( )	( )	( )	( )
Comfort	( )	( )	( )	( )	( )
Cost	( )	( )	( )	( )	( )

13. Are you: 1( ) Female 2( ) Male

14. What is your age? _____

Exhibit B.8 (Continued)

Results of the Santa Barbara Student Opinion Survey

(November 1979)

College	(n=488)
University of California at Santa Barbara (UCSB)	66.2
Westmont College (WMC)	33.8
Total	100.0

	UCSB	WMC	All
Local Residence	(n=321)	(n=163)	(n=484)
On-campus	26.5	82.2	45.2
Off-campus	73.5	17.8	54.8
Total	100.0	100.0	100.0
Car Availability at Local Residence	(n=322)	(n=164)	(n=486)
Yes	56.8	43.3	52.3
No	43.2	56.7	47.7
Total	100.0	100.0	100.0
Driver's License	(n=323)	(n=164)	(n=487)
Yes	96.6	95.1	96.1
No	3.4	4.9	3.9
Total	100.0	100.0	100.0
Bicycle Availability at Local Residence	(n=322)	(n=164)	(n=486)
Yes	80.1	31.1	63.6
No	19.9	68.9	36.4
Total	100.0	100.0	100.0
Kind of Bicycle Available	(n=254)	(n=50)	(n=304)
10-speed	81.1	94.0	83.2
5, 3-speed	14.2	2.0	12.2
Single speed	4.3	2.0	3.9
Other	0.4	2.0	0.7
Total	100.0	100.0	100.0
Frequency of Bicycle Use	(n=264)	(n=63)	(n=327)
4 or more days per week	73.9	11.1	61.8
1 to 3 days per week	15.2	15.9	15.3
Less than once per week	5.3	23.8	8.9
Less than once per month	5.7	49.2	14.1
Total	100.0	100.0	100.0

Exhibit B.8 (Continued)

	UCSB	WMC	All
Major Mode of Local Travel	(n=318)	(n=162)	(n=480)
Drive myself	22.6	43.2	29.6
Auto passenger	4.7	30.2	13.3
Bicycle	48.4	2.5	32.9
Bus	14.5	22.2	17.1
Walk	8.8	0.6	6.0
Other	0.9	1.2	1.0
Total	100.0	100.0	100.0
Frequency of Bus Travel	(n=322)	(n=164)	(n=486)
4 or more days per week	15.5	6.1	12.3
1 to 3 days per week	18.3	25.6	20.8
Less than once per week	28.0	28.7	28.2
Less than once per month	16.5	14.0	15.6
Never	21.7	25.6	23.0
Total	100.0	100.0	100.0
Ever Accessed Bus Stops by Bicycle	(n=267)	(n=126)	(n=393)
Yes	30.0	7.9	22.9
No	70.0	92.1	77.1
Total	100.0	100.0	100.0
Respondent Informed about Bicycle-Trailer Service	(n=313)	(n=163)	(n=476)
Yes	83.7	93.9	87.2
No	16.3	6.1	12.8
Total	100.0	100.0	100.0
Source of Information	(n=257)	(n=149)	(n=406)
Saw it operating	94.9	94.6	94.8
Newspapers	1.9	0.0	1.2
Friends	2.7	0.7	2.0
Brochures	0.4	2.7	1.2
Bicycle shops	0.0	0.0	0.0
Other	0.0	2.0	0.7
Total	100.0	100.0	100.0
Ever Used Bicycle-Trailer Service	(n=295)	(n=153)	(n=448)
Yes	15.3	7.8	12.7
No	84.7	92.2	87.3
Total	100.0	100.0	100.0

Exhibit B.8 (Continued)

	UCSB	WMC	All
Last Time Respondent Used Bicycle-Trailer Service	(n=44)	(n=14)	(n=58)
Before January 1978	9.1	0.0	6.9
January 1978 to May 1979	9.1	0.0	6.9
After June 1979	81.8	100.0	86.2
Total	100.0	100.0	100.0
Comparison between Bicycle-Trailer Service and Usual Travel Mode			
A. Convenience	(n=188)	(n=119)	(n=307)
Much better	25.0	17.6	22.1
Better	23.9	32.8	27.4
About the same	31.9	18.5	26.7
Worse	16.5	27.7	20.8
Much worse	2.7	3.4	2.9
Total	100.0	100.0	100.0
B. Ease of Use	(n=179)	(n=120)	(n=299)
Much better	22.3	19.2	21.1
Better	19.0	26.7	22.1
About the same	39.1	31.7	36.1
Worse	17.9	19.2	18.4
Much worse	1.7	3.3	2.3
Total	100.0	100.0	100.0
C. Safety	(n=171)	(n=119)	(n=290)
Much better	25.1	16.8	21.7
Better	33.3	31.1	32.4
About the same	34.5	40.3	36.9
Worse	5.8	8.4	6.9
Much worse	1.2	3.4	2.1
Total	100.0	100.0	100.0
D. Speed to Destination	(n=174)	(n=118)	(n=292)
Much better	17.8	14.4	16.4
Better	23.0	13.6	19.2
About the same	36.2	22.9	30.8
Worse	20.1	39.0	27.7
Much worse	2.9	10.2	5.8
Total	100.0	100.0	100.0
E. Frequency of Service	(n=170)	(n=119)	(n=289)
Much better	11.8	21.0	15.6
Better	11.2	27.7	18.0
About the same	40.6	26.9	34.9
Worse	31.2	20.2	26.6
Much worse	5.3	4.2	4.8
Total	100.0	100.0	100.0

Exhibit B.8 (Continued)

	UCSB	WMC	All
F. Security	(n=169)	(n=118)	(n=287)
Much better	14.2	13.6	13.9
Better	26.0	32.2	28.6
About the same	52.1	46.6	49.8
Worse	6.5	5.9	6.3
Much worse	1.2	1.7	1.4
Total	100.0	100.0	100.0
G. Reliability	(n=172)	(n=118)	(n=290)
Much better	15.1	16.9	15.9
Better	19.2	34.7	25.5
About the same	48.3	35.6	43.1
Worse	15.1	11.0	13.4
Much worse	2.3	1.7	2.1
Total	100.0	100.0	100.0
H. Comfort	(n=171)	(n=119)	(n=290)
Much better	16.4	16.8	16.6
Better	27.5	26.9	27.2
About the same	46.8	35.3	42.1
Worse	7.6	17.6	11.7
Much worse	1.8	3.4	2.4
Total	100.0	100.0	100.0
I. Cost	(n=171)	(n=120)	(n=291)
Much better	22.8	38.3	29.2
Better	23.4	30.8	26.5
About the same	45.0	20.8	35.1
Worse	7.0	5.8	6.5
Much worse	1.8	4.2	2.7
Total	100.0	100.0	100.0
Respondent's Sex	(n=319)	(n=163)	(n=482)
Female	51.4	53.4	52.1
Male	48.6	46.6	47.9
Total	100.0	100.0	100.0
Respondent's Age	(n=315)	(n=162)	(n=477)
18 or younger	18.1	34.0	23.5
19 to 24	65.7	58.6	63.3
25 to 34	15.2	7.4	12.6
35 or older	1.0	0.0	0.6
Total	100.0	100.0	100.0

Exhibit B.9

1980 Household Telephone Survey Form and Results

Date:_____ Address:_____ Phone Number:_____

Hello, my name is _____, with the Santa Barbara Metropolitan Transit District. We are conducting a survey of peoples' travel habits and I would like to ask you a few questions. First, I need to determine which person in your household I should speak with.

A. How many people old enough to ride a transit bus are currently living at this residence? _____ [CIRCLE NUMBER IN COLUMN A BELOW.]

B. How many of these are males? _____[CIRCLE NUMBER IN ROW B BELOW.]

COLUMN A (VERSION 2)

NUMBER OF ADULTS IN HOUSING UNIT

ROW B: NUMBER OF MEN IN HOUSING UNIT	1 Adult	2 Adults	3 Adults	4 or More	
0 Men	Adult	Oldest Woman	Youngest Woman	Youngest Woman	
1 Man	Adult	Man	Man	Oldest Woman	
2 Men		Oldest Man	Youngest Man	Youngest Man	
3 Men			Youngest Man	Oldest Man	
4 or More				Oldest Man	

[CIRCLE WHERE A AND B ANSWERS MEET--INTERVIEW THIS PERSON]

C. For this survey, I would like to speak to [PERSON CIRCLED ABOVE]. Is he/she at home?

D. [IF YES, BEGIN INTERVIEW--GO TO QUESTION 1. IF PERSON IS NOT AT HOME, ASK:] What would be a good day and time for me to call back to reach him/her?

[CALL BACK TIME & DATE]_____

What is his/her name, so I'll know whom to ask for:_____[NAME].

1. How far do you live from a bus stop?

_____Blocks or _____Miles ( ) Don't Know

2. Have you ever used local Santa Barbara MTD buses?

1( ) No

2( ) Yes . . . How often do you currently ride the bus?

a( ) 4 or more days a week
b( ) 1 - 3 days a week
c( ) Less than once a week
d( ) Less than once a month
e( ) Never

3. How do you do most of your local traveling?

1( ) Drive myself

2( ) Driven by someone

3( ) Bus, Which Route(s)? _____.

4( ) Bicycle

5( ) Motorcycle, Moped, Scooter

6( ) Walk

7( ) Other, How? _____.

4. How many people live in your household? _____(Number of people)

5. How many automobiles are owned or operated by members of your household?
_____(Number of Autos)

6. How many bicycles are owned or operated by members of your household?
_____(Number of bicycles) (If zero bicycles, skip question number 8)

7. Have you or anyone in your household ever ridden their bicycle to get to a bus stop?

1( ) No

2( ) Yes. . . 7a) What is age and sex of that person? _____years
( ) Female ( ) Male 8b) Which bus stop did she/he ride to?
_____(Intersection or landmark)
( ) Don't Know

7b) Did you leave your bike in a bike rack at that bus stop?
1( ) No, used Bike/Bus. 3( ) No, no rack was available
2( ) Yes 4( ) Other:_____

8. Have you heard about SBMTD bicycle trailer bus service?

1( ) No (Skip to question number 11)

2( ) Yes . . . Where did you hear about it?

a( ) Saw it operating
b( ) Newspaper
c( ) Radio
d( ) Brochures/Flyers
e( ) Friends or Family
f( ) Bicycle Shop or Organization
g( ) Other. . . Where? _____.

9. Have you, or anyone in your household, ever used the bicycle trailer bus service?

1( ) No

2( ) Yes . . . Did you (or others) use it in the last year?

a( ) Before January 1978
b( ) Between January 1978 and May 1979
c( ) Since June 1979

(Reason for stopping use, if given)_____

10. Are you: (Read List)

1( ) Employed? . . .What occupation? _____.

2( ) A Student

3( ) Retired

4( ) A Homemaker

5( ) Not Currently Employed

11. Do you have a valid driver'slicense?

1( ) Yes

2( ) No

12. What is your age?_____

1( ) Refused to answer

13. Are you:

1( ) Female

2( ) Male

THANK YOU FOR HELPING US WITH THIS SURVEY.

Exhibit B.9 (Continued)

Results of the Santa Barbara Household Telephone Survey
(May 1980)

Number of Household Members Old Enough to Ride a Transit Bus	(n=595)
1 person	21.0
2 persons	43.5
3 persons	14.6
4 or more persons	20.8
Total	100.0

Distance between Respondent's Residence and Nearest Bus Stop	(n=558)
Less than 1 block	10.8
1 block	40.1
2 blocks	21.7
3 blocks	13.6
4 to 6 blocks	8.9
7 or more blocks	4.8
Total	100.0
Mean distance: 2.3 blocks	
Median distance: 1.5 blocks	

Use of Local SBMTD Buses	(n=469)
Yes	59.7
No	40.3
Total	100.0

Frequency of Bus Travel	(n=406)
4 or more days per week	18.0
1 to 3 days per week	20.7
Less than once per week	17.0
Less than once per month	32.5
Never	11.8
Total	100.0

Major Mode of Local Travel	(n=597)
Drive myself	60.1
Auto passenger	4.2
Bus	15.7
Bicycle	13.1
Motorcycle	2.0
Walk	4.9
Total	100.0

Exhibit B.9 (Continued)

Number of Household Members	(n=594)
1 person	19.9
2 persons	37.9
3 persons	16.3
4 persons	15.0
5 or more persons	10.9
Total	100.0

Number of Cars in Respondent's Household	(n=596)
None	9.2
1 car	37.6
2 cars	33.6
3 cars	12.4
4 or more cars	7.2
Total	100.0

Number of Bicycles in Household	(n=596)
None	32.9
1 bike	19.0
2 bikes	25.7
3 bikes	10.1
4 or more bikes	12.3
Total	100.0
Mean number of bicycles: 1.6	
Median number of bicycles: 1.4	

Ever Accessed Bus Stops by Bicycle	(n=523)
Yes	13.6
No	86.4
Total	100.0

Age of Household Member Accessing Bus Stops by Bicycle	(n=68)
18 or younger	16.1
19 to 24	45.7
25 to 34	22.2
35 or older	16.3
Total	100.0

Sex of Same Household Member	(n=68)
Female	39.7
Male	60.3
Total	100.0

Exhibit B.9 (Continued)

Bicycle-Rack Use at Bus Stop by Same Household Member	(n=65)
Yes	66.2
No, no rack available	7.7
No, used bicycle-trailer	21.5
Other	4.6
Total	100.0

Respondent Informed about Bicycle-Trailer Service	(n=422)
Yes	87.7
No	12.3
Total	100.0

Source of Information	(n=526)
Saw it operating	77.6
Newspaper	6.3
Radio	7.2
Brochures	1.3
Friends	4.0
Bicycle shop	0.2
Other	3.4
Total	100.0

Ever Used Bicycle-Trailer Service	(n=520)
Yes	8.8
No	91.2
Total	100.0

Last Time Respondent Used Bicycle-Trailer Service	(n=63)
Before January 1978	14.3
January 1978 to May 1979	17.5
After June 1979	68.3
Total	100.0

Respondent's Occupation	(n=569)
Employed	53.3
Student	22.5
Retired	16.2
Homemaker	6.3
Not currently employed	1.8
Total	100.0

Exhibit B.9 (Continued)

Driver's License	(n=586)
Yes	86.5
No	13.5
Total	100.0

Respondent's Age	(n=562)
18 or younger	8.4
19 to 24	21.9
25 to 34	27.3
35 to 44	7.2
45 to 59	16.0
60 or older	19.2
Total	100.0

Respondent's Sex	(n=577)
Female	49.6
Male	50.4
Total	100.0

Exhibit B.10

1980 County Employee Survey Form and Results

SANTA BARBARA METROPOLITAN TRANSIT DISTRICT

EMPLOYEE SURVEY

We, at the Santa Barbara Metropolitan Transit District, are conducting a survey of the travel habits of downtown employees. The purpose of this survey is to collect information that will be helpful in planning and evaluating the Bicycle Trailer Bus service. The Bicycle Trailer Bus concept is presently being demonstrated in Santa Barbara with money from a federal grant and has attracted nationwide attention. Please complete the survey below and leave it in a central location in your office where MTD survey staff can pick it up later in the day.

1. The type of job you hold is:
   1( ) Managerial
   2( ) Technical
   3( ) Secretarial/Clerical
   4( ) Maintenance/Service
   5( ) Other: (title)_____.

2. How many days do you travel to and from work by each of the following ways?

	To Work	From Work	
Drive Myself	_____	_____	Days Per Week
Driven by Someone	_____	_____	Days Per Week
Bus, Which Route(s)? _____	_____	_____	Days Per Week
Bicycle	_____	_____	Days Per Week
Motorcycle, Moped, Scooter	_____	_____	Days Per Week
Walk	_____	_____	Days Per Week
Other, How? _____	_____	_____	Days Per Week

3. Is a car available to you to commute to and from work?
   1( ) No
   2( ) Yes, without inconvenience to myself or others
   3( ) Yes, but with considerable inconvenience to myself or others

4. Where do you live? _____.
   (Street Address or Nearest Intersection)

   _____.
   (City or Area) (Zip Code)

5. How far do you live from a bus stop? _____ Blocks or
   _____ Miles
   ( ) Don't Know

6. Besides going to and from work, how often do you ride the SBMTD buses?
   1( ) 4 or more days a week
   2( ) 1 - 3 days a week
   3( ) Less than once a week
   4( ) Less than once a month
   5( ) Never ride the bus

(Continued)

Exhibit B.10 (Continued)

7. Do you own a bicycle?

   1( ) No (Skip to question #9)

   2( ) Yes. . . How often do you ride your bicycle?

      a( ) 4 or more days a week
      b( ) 1 - 3 days a week
      c( ) Less than once a week
      d( ) Less than once a month
      e( ) Have not ridden a bike in over 12 months

8. Have you ever used your bicycle for getting to and from the bus stops?

   1( ) Yes. . . What stops? _____.

   2( ) No

9. Have you heard about SBMTD bicycle trailer bus service?

   1( ) No (Skip to question #11)

   2( ) Yes . . . Where did you hear about it?

      a( ) Saw it operating
      b( ) Newspaper
      c( ) Radio
      d( ) Brochures/Flyers
      e( ) Friends or Family
      f( ) Bicycle Shop or Organization
      g( ) Other . . .Where? _____.

10. Have you ever used the bicycle trailer bus service?

   1( ) No

   2( ) Yes. . . When did you use it last?

      a( ) Before January 1978
      b( ) Between January 1978 and May 1979
      c( ) Since June 1979

11. Do you have a valid driver's license?

   1( ) No

   2( ) Yes

12. How many automobiles are owned or operated by members of your household?

   _____ Cars

13. Are you

   1( ) Female

   2( ) Male

14. How old are you?

   1( ) 18 or under 4( ) 35 to 45

   2( ) 19 to 24 5( ) 45 to 59

   3( ) 25 to 34 6( ) 60 or over

Thank you for completing this survey. The space below may be used for any comments or suggestions you may have concerning Santa Barbara's bicycle trailer bus or regular transit service.

Exhibit B.10 (Continued)

Results of the Santa Barbara Employee Survey

(May 1980)

Respondent's Type of Occupation	(n=183)
Managerial	17.5
Technical/professional	27.3
Secretarial/clerical	45.9
Other	9.3
Total	100.0

Commute Mode	To Work	From Work
A. Drive Myself	(n=109)	(n=107)
Once per week	7.3	9.3
2 days per week	12.8	12.1
3 days per week	7.3	7.5
4 days per week	6.4	5.6
5 or 6 days per week	66.0	65.5
Total	100.0	100.0
B. Auto Passenger	(n=33)	(n=36)
Once per week	9.1	13.9
2 days per week	21.2	19.4
3 days per week	18.2	11.1
4 days per week	12.1	11.1
5 or 6 days per week	39.4	44.4
Total	100.0	100.0
C. Bus	(n=26)	(n=28)
Once per week	7.7	14.3
2 days per week	15.4	10.7
3 days per week	3.8	3.6
4 days per week	3.8	7.1
5 or 6 dyas per week	69.2	64.3
Total	100.0	100.0
D. Bicycle	(n=16)	(n=16)
Once per week	25.0	25.0
2 days per week	6.3	6.3
3 days per week	25.0	25.0
4 days per week	6.3	6.3
5 or 6 days per week	37.5	37.5
Total	100.0	100.0

Exhibit B.10 (Continued)

	To Work	From Work
E. Motorcycle	(n=4)	(n=4)
5 or 6 days per week	100.0	100.0
Total	100.0	100.0
F. Walk	(n=28)	(n=28)
Once per week	14.3	14.3
3 days per week	7.1	7.1
4 days per week	7.1	10.7
5 or 6 days per week	71.4	67.9
Total	100.0	100.0
G. Commute Mode 4 or more days per Week	(n=152)	(n=154)
Drive myself	52.0	49.4
Auto passenger	11.2	13.0
Bus	12.5	13.0
Bicycle	3.9	4.5
Motorcycle	2.6	2.6
Walk	14.3	14.5
Other	3.3	3.2
Total	100.0	100.0

Car Availability for Commuting	(n=181)
No	13.3
Yes, inconveniently	12.2
Yes, conveniently	74.6
Total	100.0

Distance between Respondent's Residence and Nearest Bus Stop	(n=164)
1 block	37.2
2 blocks	25.6
3 blocks	12.8
4 to 6 blocks	12.2
7 or more blocks	12.2
Total	100.0
Mean distance: 3.5 blocks	
Median distance: 2.0 blocks	

Frequency of Bus Travel besides Commuting	(n=180)
4 or more days per week	2.2
1 to 3 days per week	6.1
Less than once per week	10.6
Less than once per month	22.2
Never	58.9
Total	100.0

Exhibit B.10 (Continued)

Bicycle Ownership	(n=183)
Yes	49.7
No	50.3
Total	100.0

Frequency of Bicycle Use	(n=89)
4 or more days per week	13.5
1 to 3 days per week	21.3
Less than once per week	16.9
Less than once per month	29.2
Never	19.1
Total	100.0

Ever Accessed Bus Stops by Bicycle	(n=99)
Yes	8.1
No	91.1
Total	100.0

Respondent Informed about Bicycle-Trailer Service	(n=178)
Yes	96.6
No	3.4
Total	100.0

Source of Information	(n=174)
Saw it operating	91.2
Newspaper	1.8
Radio	4.7
Friends	1.2
Other	1.2
Total	100.0

Ever Used Bicycle-Trailer Service	(n=174)
Yes	6.3
No	93.7
Total	100.0

Last Time Respondent Used Bicycle-Trailer Service	(n=12)
Before January 1978	41.7
January 1978 to May 1979	33.3
After June 1979	25.0
Total	100.0

Exhibit B.10 (Continued)

Driver's License	(n=182)
Yes	94.5
No	5.5
Total	100.0

Number of Cars in Respondent's Household	(n=178)
None	2.8
1 car	39.9
2 cars	39.3
3 cars	13.5
4 or more cars	4.5
Total	100.0

Mean number of cars: 1.8
Median number of cars: 1.7

Respondent's Sex	(n=183)
Female	61.7
Male	38.3
Total	100.0

Respondent's Age	(n=179)
18 or younger	0.0
19 to 24	10.1
25 to 34	26.8
35 to 44	19.0
45 to 59	36.9
60 or older	7.3
Total	100.0

Exhibit B.11

1979 Cabrillo Boulevard Bikeway Survey Form and Results

CABRILLO BOULEVARD BIKEWAY SURVEY

1. For what purpose are you riding a bicycle today?
   ☐ Work ☐ Recreation ☐ Other, please specify
   ☐ School ☐ Shopping _____

2. If you did not ride your bicycle to this area, what mode did you use?
   ☐ Auto driver ☐ Bus ☐ Other, please specify
   ☐ Auto passenger ☐ Walked _____

3. In the first column check the location where you started this bicycle trip. In the second column check your immediate destination.

☐	Cabrillo Boulevard Area	☐
☐	Summerland	☐
☐	Montecito	☐
☐	Eastside, Milpas area	☐
☐	Downtown Santa Barbara	☐
☐	Westside	☐
☐	Mesa, SBCC	☐
☐	Northside, Upper State	☐
☐	Goleta Valley, North	☐
☐	Goleta Valley, South	☐
☐	Isla Vista, UCSB	☐
_____	Other (please specify).	_____

4. How frequently do you use this bike path?
   ☐ Less than two days a week ☐ More than five days a week
   ☐ 2-5 days a week ☐ Visitor-today only

5. Did you have a car available to make this trip?
   ☐ No ☐ Yes, but prefer to bicycle
   ☐ Yes, but at an inconvenience to others

6. Most important reason you are riding this bikeway.
   ☐ Convenience ☐ Economy ☐ Health ☐ Conservation
   ☐ Safety ☐ Speed ☐ Scenic ☐ Enjoyment

7. Would you make this trip in rainy weather?
   ☐ Yes ☐ No ☐ Maybe

8. Do you sometimes use the bikeway to
   ☐ Rollerskate ☐ Walk ☐ Jog

9. Please check your age and sex.
   ☐ 0-16 ☐ 25-60 ☐ Male
   ☐ 17-24 ☐ Over 60 ☐ Female

10. Have you ever had an accident on any off-road bike path?
    ☐ Yes ☐ No

    If yes and you would be willing to provide information about the accident, please print your name and the phone number where you can be contacted _____ Phone_____.

11. Do you feel this bikeway:

Should be restricted to only bicycles	☐ Yes	☐ No	☐ No opinion
Is adequately maintained?	☐ Yes	☐ No	☐ No opinion
Is safe?	☐ Yes	☐ No	☐ No opinion
Is too crowded?	☐ Yes	☐ No	☐ No opinion
Should be extended?	☐ Yes	☐ No	☐ No opinion

Please list any compliments, complaints or comments you may have on the reverse side of this questionnaire. Thank you and happy cycling.

Exhibit B.11 (Continued)

Results of the Cabrillo Boulevard Bikeway Survey
(August 1979)

Trip Purpose	(n=299)
Work	18.7
School	2.7
Recreation	60.5
Shopping	6.0
Other	12.0
Total	100.0

Alternative Trip Mode	(n=119)
Auto driver	45.4
Auto passenger	15.1
Bus	10.9
Walk	23.5
Other	5.0
Total	100.0

Frequency of Bike Path Use	(n=260)
Less than 2 days per week	36.2
2 to 5 days per week	40.0
More than 5 days per week	23.8
Visitor - today only	0.0
Total	100.0

Car Availability for Trip	(n=242)
No	40.1
Yes, inconveniently	0.4
Yes, conveniently	59.5
Total	100.0

Reason for Riding Bikeway	(n=404)
Convenience	9.7
Safety	9.9
Conservation	6.7
Economy	7.4
Speed	4.5
Health	12.1
Scenic	10.1
Enjoyment	39.6
Total	100.0

Exhibit B.11 (Continued)

Willingness to Make Same Trip in Rain	(n=244)
Yes	17.2
No	49.2
Maybe	33.6
Total	100.0

Other Bikeway Uses	(n=269)
Rollerskate	23.8
Walk	25.7
Jog	9.7
None	40.9
Total	100.0

Respondent's Age	(n=252)
16 or younger	18.7
17 to 24	32.5
25 to 60	44.8
60 or older	4.0
Total	100.0

Respondent's Sex	(n=225)
Female	38.2
Male	61.8
Total	100.0

Ever Had an Accident on any off-Road Bike Path	(n=249)
Yes	21.7
No	78.3
Total	100.0

Attitudes about Bikeway	Yes	No	Don't know	Total
Should be restricted to only bicycles (n=211)	55.9	35.5	8.5	100.0
Is adequately maintained (n=228)	74.1	21.5	4.4	100.0
Is safe (n=223)	61.0	35.4	3.6	100.0
Is too crowded (n=226)	62.8	31.4	5.8	100.0
Should be extended (n=226)	85.0	5.8	9.3	100.0

Appendix C

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Appendix D

REPORT OF NEW TECHNOLOGY

This evaluation of the Santa Barbara bicycle and transit service demonstration project did not result in any new inventions. However, the bicycle-trailer that was designed, developed and operated by the Santa Barbara Metropolitan Transit District during the demonstration may be considered an improved invention. This evaluation report identifies why this third-generation bicycle-trailer is a significant improvement over earlier trailer models and includes specifications for this trailer in Appendix A.

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